

Scavenger 4 from Psygnosis: this CD game 'has *Rebel Assault* well and truly licked.' (Page 72.) This image was rendered for Edge in Alias *PowerAnimator*, running on a Silicon Graphics Indigo (see report from 1994 SG developers' conference, p18)

ED

Performance, progress… and power stations

This year is the calm before the storm: when Saturn, PS-X, Project Reality and God knows what other systems hit the stores.

But this continual quest for higher performance has left current systems in a technological no-man's land. Programmers are less keen to explore the possibilities of current hardware if they think that their efforts will be wasted: what's the point of optimising your code and stretching the capabilities of the SNES or Mega Drive if the thing will be redundant in a year's time?

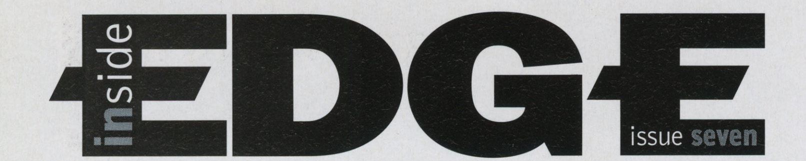
The 8bit systems – specifically the C64 – had the relative luxury of a lifespan which remained healthy for four or five years. At its peak popularity, programmers were producing effects on the 64 that even Commodore thought impossible: multiplexed sprites, sampled speech plus pseudo four-channel music, fast polygon routines, multilayer parallax scrolling… And the games were playable, too.

No-one can honestly say that the SNES or Mega Drive have been pushed as far. Both machines should have so much more to offer – but who cares with Saturn and Project Reality on the hardware horizon?

At least the up and coming systems will afford programmers the sheer power to do what they want without having to concentrate their efforts on optimising code for faster, smoother graphics.

With fewer restrictions on speed, colours and sound, the machines can do the work, leaving programmers and designers free to concentrate on gameplay. And, given their quantum leap in performance, it will be a while before these machines are again leapfrogged by even more powerful technology. And that can only be a good thing.

The **future** is almost here…



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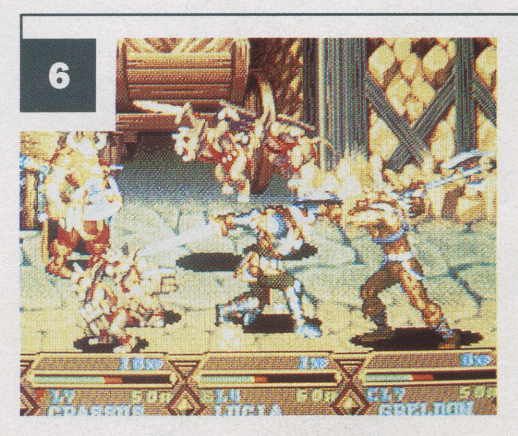
Print
Cradley Print
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Edge is printed on Royal Press 90 gsm

Typography (Adobe®)
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Bell Gothic Light/**Black**





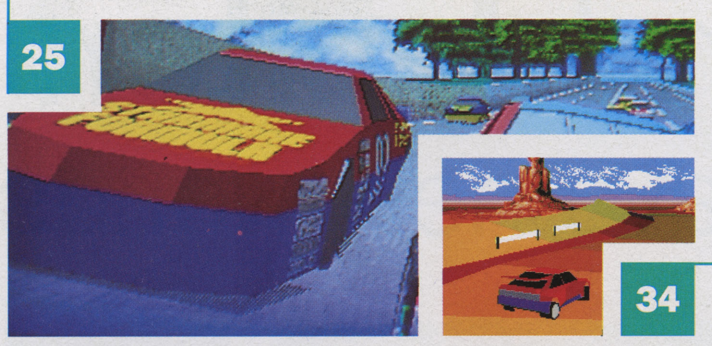
insideview



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News

Edge's newshounds went on overtime this month, digging up world exclusive news of Sega's Saturn; top slots from the 50th ATEI coin-op show in London; details of a new 3D rendering software system; full specs on TXE's Multi System; and a report from Silicon Graphics' developers' conference. You read it here first

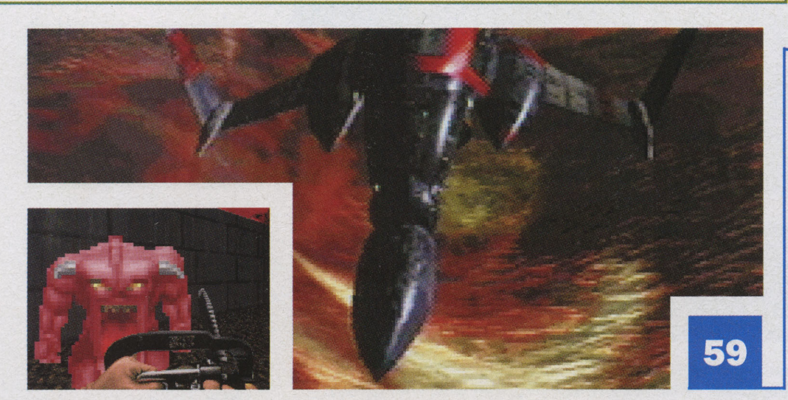


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Prescreen

Once again **Edge** skims the cream of the videogame world: *Daytona* on Sega's Model 2 coin-op (main); *PowerSlide* on SNES (inset); and loads more



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Testscreen

This month's gaming highlights are *Scavenger 4* (main) and *Doom: Evil Unleashed* (inset). We also pump a load of cash into Namco's *Ridge Racer*

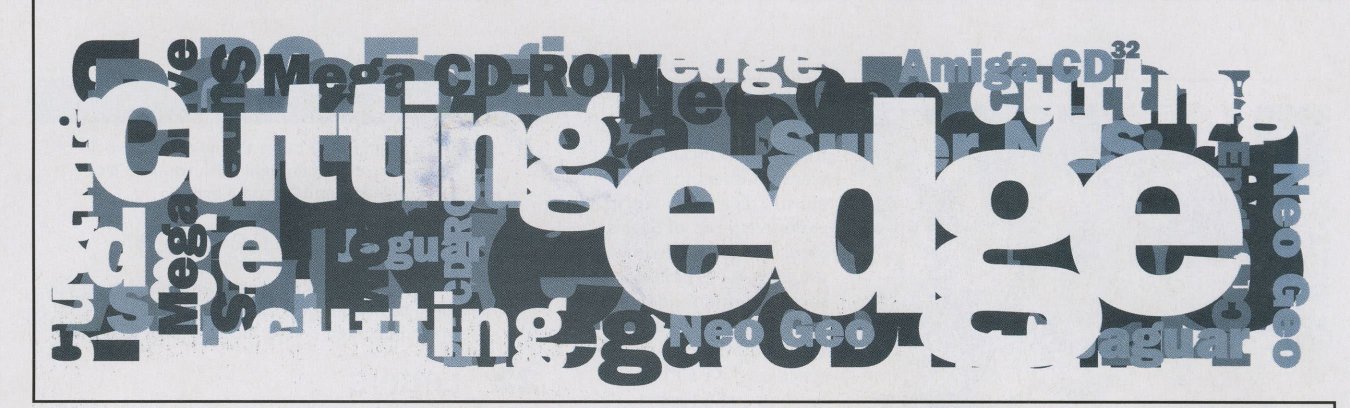
Jez San

From *Starglider* to *StarWing* and beyond: Jez San and his 50-strong team of Argonauts are at the very leading edge of videogames technology. **Edge** spoke to Jez about tech-specs, software, hardware, vapourware and etherware

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Photograph: Jude Edgington

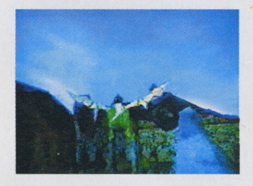
Sega Saturn: twin systems revealed, **page 6...** Full coin-op report from **ATEI show** in London, **page 10...** **3DO** hits Japan – full game listing, **page 12...** Jaguar: **Atari**'s problem child, **page 13...** TXE **Multi System** appears, **page 15...** PCs get 3D **RenderWare, page16...**



The very latest **news** from across the entire world of videogaming

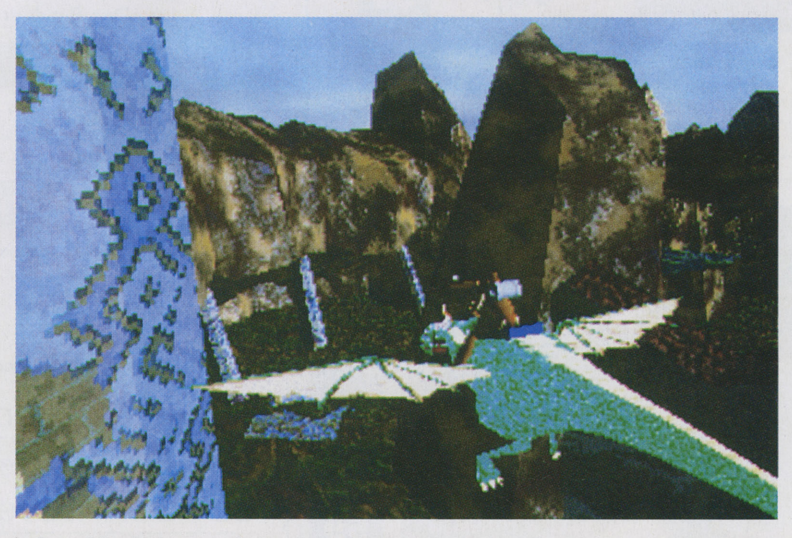
Saturn and Jupiter: Sega's brave new worlds

Edge uncovers Sega's secret plans for 32bit videogaming: the next level should really be out of this world





From the CES demo – this 3D shoot 'em up looked stunning, with detailed texture-mapping (right) and smooth 3D scrolling



One of the first screenshots released by Sega Japan is sadly only accompanied by the unimaginative title '3D shooting game'. With texture-mapping like this, who cares?







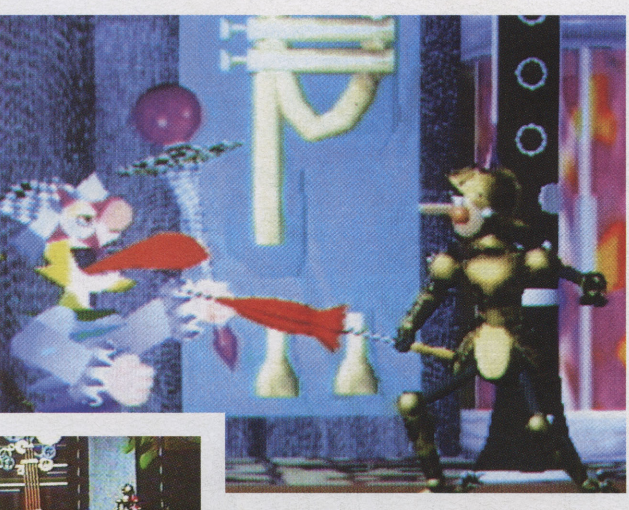
***Virtua Soccer* (top and centre) uses a stunning textured environment. *Virtua Fighters* looks exactly like the coin-op**

The fever pitch surrounding Sega's new 32bit system has just tapped another dimension. Following detailed reports in **Edge** five and six, we can now reveal that not one, but *two* consoles will be released by Sega in November this year.

The Saturn project was expected to be a CD-ROM-based system with the possibility of a cartridge port. Not only have Sega decided to include the port, but a second, cartridge-only, machine codenamed 'Jupiter' will also appear.

Only in the last few weeks have Sega released details about Saturn to the Japanese press, but at the time of writing, project Jupiter has still not been officially announced. Complete compatibility between the two systems will be possible with the release of a low-cost add-on for Jupiter which will provide the same double-speed CD-ROM drive, MPEG chips and extra RAM.

But why have Sega gone for this →





The fabulously animated 'action game' – a wind-up doll character fights a jack-in-a-box

Until you see it move you won't be able to appreciate just how stunning this really is

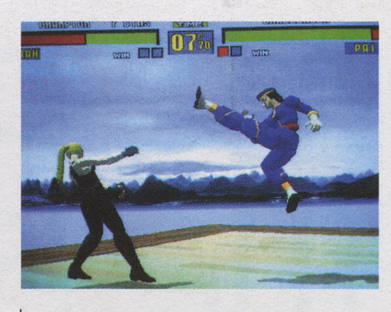
← approach instead of the fully-fledged CD machine? A beefed-up spec could be one reason – Sega are reputed to have increased the polygon rendering abilities of Saturn to try and match the power of Sony's more powerful PS-X.

A cartridge system allows them to bring out a more affordable machine – ¥30,000 (£185) as opposed to Saturn's price of ¥50,000 (£310) – while still retaining the same power. Both systems will rely on the same seven-processor architecture, including two ultra-fast Hitachi SH2s plus 24bit digital signal processing.

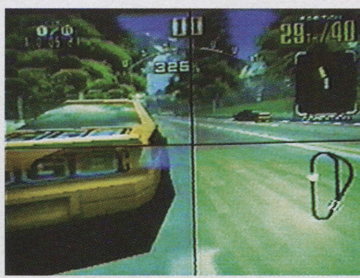
Rumours of an American launch just before this Christmas have already started circulating in the US, although that will mostly likely depend on the strength of the Genesis market and the quality and number of 32bit games ready for release. Also, Microsoft's involvement with Saturn's operating system has delayed the arrival of non-Japanese development kits for another two months.

Still, Sega reckon 40 titles are currently in development in Japan and this month they will be announcing ten games to the Japanese press. Currently, the only officially announced titles are *Virtua Fighters*, *Virtua Soccer*, a '3D shooting game', and an 'action game', but conversions of *Daytona* and the *Sonic* coin-op are also under way.

The first proper public viewing of Sega's 32bit hardware is likely to be at the Tokyo Toy Show which takes place in June, but check out next month's report from the AOU Show in case Sega decide to spring any surprises. Whatever happens, count on **Edge** for the most detailed and accurate news on this hot new system...



Virtua Fighters **looks identical on Saturn and moves just as well**



Daytona **is a conversion of the new Model 2 racing game (see pages 26-27)**

Other Saturn rumours

A couple of choice ones: Game Arts are developing a new 3D shoot 'em up for Saturn (a realtime *Silpheed 2* perhaps?) as well as an RPG...

Edge has heard that it takes just two weeks to transfer code from Sega's Model 1 coin-op board (*Virtua Racing*, *Virtua Fighters*) to work on Saturn...

Finally, think of Saturn's biggest moon and you have Sega's next generation 64bit arcade hardware – Titan.

What is it?

On show at the Las Vegas CES, this machine contains four MIPS R4400 RISC processors each running at 150MHz. It can generate 3D visuals in realtime, at up to two million polygons per second. And it was on the Nintendo stand

Saturn tech specs



Format: CD-ROM (300K/s) and cartridge

CPU: Two Hitachi SH2 32bit RISC chips running at 27 MHz/50 MIPS

Co-processing: Hitachi SH1, 24bit DSP, Motorola 68000, video processor

Memory: Work RAM – 16 megabits
Video RAM – 12 megabits
Sound RAM – 4 megabits
CD Buffer RAM – 4 megabits

Colours: 16,277,216

Video: Alpha channel, MPEG

Scrolling: Five hardware planes: enlargement, reduction, rotation, horizontal scrolling in two planes

3D graphics: 900,000 polygons/sec, Gouraud shading, texture-mapping

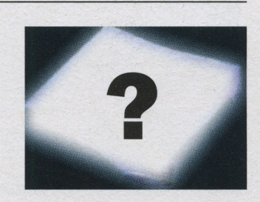
Sprites: Four hardware sprite planes, plus two hardware sprite rotation/scaling planes

Sound: 16bit 68EC000, PCM 32 channels, FM eight channels

Price: ¥50,000

Release: November '94

Jupiter tech specs



The specifications of Jupiter are virtually the same as Saturn, but with around half the internal RAM

Format: Cartridge

Memory: 16 megabits RAM – the internal memory allocation has not yet been confirmed

Price: ¥30,000

Release: November '94

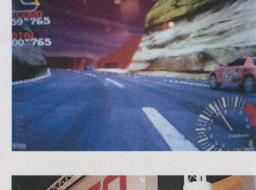
Coin-opposition: the 50th ATEI

it is...

Silicon Graphics' Onyx Reality Engine². A far cry from Nintendo/SG's Project Reality, the Onyx RE² is SG's top-end workstation, purported to be the most powerful 3D graphics generator in the world (see p18)

Will it ever be 'game over' for the coin-op industry? Edge visited the UK amusement trade's biggest show to find some answers







Namco's astonishingly good three-screen version of *Ridge Racer* (left). The fullscale version (above), comes with sit-in MX-5

There were times when the videogame sector of that most unsalubrious of industries, the coin-op trade, would have dwarfed the entire Amusement Trade Exhibition. Times when you could have quite happily spent an entire day wandering from machine to machine piling on the free credits, only wishing your C64 could emulate the visuals.

ATEI '94 was yet another symptom of the downturn in the coin-operated videogame market. If it was a big, expensive machine with a Namco or Sega logo, then it probably stood a good chance. If it was a PCB which offered two-dimensional graphics and seemed only as good as a half-decent SNES game, its days were numbered.

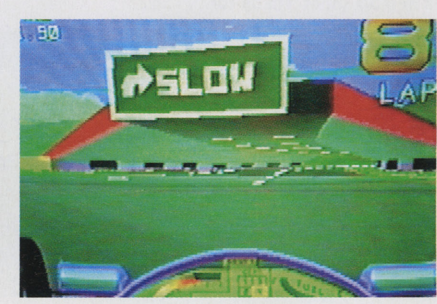
The interchangeable PCB that the industry enthused over during its teething days is being slowly and grudgingly put to rest, and the evidence was there at ATEI. Large and costly dedicated machines are clearly the industry's only response to the threat posed by consoles. And that was Namco's message with *Ridge Racer* – →



Sega's answer to *Ridge Racer*, the equally impressive *Daytona*, in full effect



Konami's *Racin' Force*: strong similarities to their excellent 1987 hit *WEC Le Mans*



Jaleco's effort – *Driver's Edge* – has slower polygons than Namco had four years ago





The screen (left) that played the demo of Sega's *Daytona*. The detail is smart (right), even though the game is only 5% complete

← the spectacular driving game which got its UK premiere five months after rearing its headlights at the Japanese Amusement Machine Show (**Edge** 2).

Fortunately, Namco's game was every bit as good as people had hoped (see Testscreen, page 64), and blew away competing racing games by companies like Konami (*Racin' Force*) and Jaleco (*Driver's Edge*). The fabulous three-screen version debuted internationally at ATEI and proved to be the best one yet – even overtaking the £120,000 fullscale simulator model complete with Mazda MX-5 (although the speed of the cars in that machine had been deliberately limited to 85mph for the purposes of a driving competition held at the show).



Sega's *Jurassic Park* (above), another unfinished game, made a sneak preview

Sega's response

was a rather half-hearted one. On a single projection monitor ran a demonstration of their next racing game, *Daytona*. But it was the same demo shown at the Amusement Machine Show (AMS) in Japan last August, and the same one that CES delegates were presented with in Chicago back in June. So why haven't there been any obvious improvements this far down the track?

Well, there have been – major ones, in fact – but these were being held over for the crowds attending the Amusement Operators' Union (AOU) show – the big Japanese coin-op fair which **Edge** is also attending (see preview on page 11). The ATEI, despite enjoying its 50th birthday, clearly wasn't considered by Sega to be important enough for them to uncloak *Daytona*, and more importantly, the power behind it: the Model 2 board.

Model 2, the product of a joint-venture with Martin Marrieta, a division of General Electric in the US, is the successor to the Model 1 board found in *Virtua Racing* and *Virtua Fighters*. It offers more polygons (300,000 per second, to be exact), proper texture-mapping and full shading effects, and manages to deliver the best 3D graphics this side of *Ridge Racer*. What this early demonstration lacked in colours and detail, it more than made up for with stylish camera angles and fast action.







The CPS II system (top) runs new Capcom games, like *Dungeons And Dragons* (above) and *Super SFII*

Capcom's presence was also a little downbeat at ATEI – they, like many others, were holding back for AOU. Still, no-one could deny the quality of the games on display, and while Capcom lagged behind Namco and Sega in the technology field, a couple of solid, playable titles – *Dungeons And Dragons: Tower Of Doom* and *Eco Fighters* – carved them quality slices of well-established

Continued next page

Dino carnage at its very best. *Jurassic Park* borrows heavily from stablemate *Alien³*



Capcom's *Eco Fighters* shoot 'em up won many admirers with its great graphics



Using the firm's CPS II system, *Eco Fighters* manages to retain some Capcom magic



Only being shown on video (top), *Top Hunter* (above) is SNK's smart-looking new Neo Geo game

Continued

genres. The 136meg *Tower Of Doom* marks Capcom's repeated enthusiasm for the all but dead hack 'n' slash coin-op, while attaining a high degree of both graphic detail and gameplay sophistication. Roleplaying elements, varied game routes, QSound and simultaneous fourplayer action add up to a sure-fire hit.

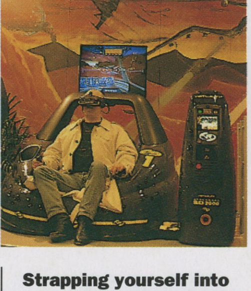
Eco Fighters was equally well produced, being a standard horizontally scrolling twoplayer shoot 'em up in the *UN Squadron* mould, with some interesting gameplay features and superbly cute graphics. This game, like *Tower Of Doom*, uses Capcom's new CPS II system – an encased base board which allows software sub-boards to plug in without a single ROM chip in sight.

Resembling an oversized SNES, the CPS II is the successor to the original CPS board used in golden oldies like *Strider, Ghouls 'n' Ghosts* and *UN Squadron. Super Street Fighter II* was the first game to use the system, making use of the faster CPU as well as extended sprite and background power. CPS II also tackles one of the more serious problems faced by Capcom in the coin-op industry – piracy.

SNK's stand was a surprising hive of activity. Home users of the Neo Geo must have been dismayed to hear rumours that *Magician Lord 2* had been canned, but as luck would have it, SNK revealed the much-delayed *Top Hunter* instead – a slick side-scrolling platform game with an interesting *Bionic Commandos*-style main character – in video demo form. Perhaps there is some life left in the platform game, after all.

Art Of Fighting 2, Windjammers (Data East), *Spin Masters* (Data East's *Miracle Adventure*) and *Super Side Kicks 2* were the other new Neo games appearing at the show, with only *Soccer Brawl 2* being held over for AOU.





Strapping yourself into this unit (above) enables you to run around the 3D world of *Zone Hunter* (top) and shoot things



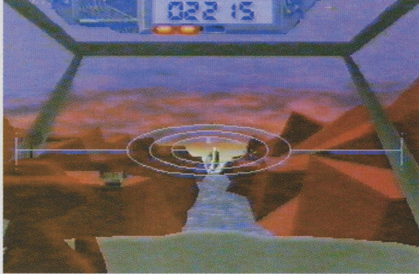
Atari's *Hard Drivin' Airborne* looks a decent piece of kit from the outside, but those graphics haven't improved since *Race Drivin'*

That bastion of unfulfilled promises, virtual reality, made a strong showing at ATEI. This time around, Virtuality – the mainstay of affordable VR coin-ops – delivered texture-mapping and improved image generation in their latest Series 2000 VR systems and software. However, for the money (£13,000 up), the technology was far from leading-edge stuff.

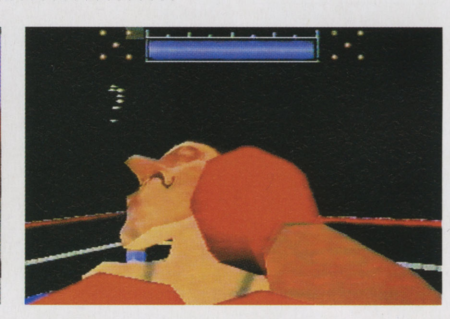
On the other hand, US company Division, comfortable in their private suite, didn't have any such problems. Their system – the Provision 100 – was →



The old graphics in this new version of *Hard Drivin'* failed to impress show-goers



Virtuality's *X-Treme Strike*, an intergalactic space shoot 'em up, is a good blast

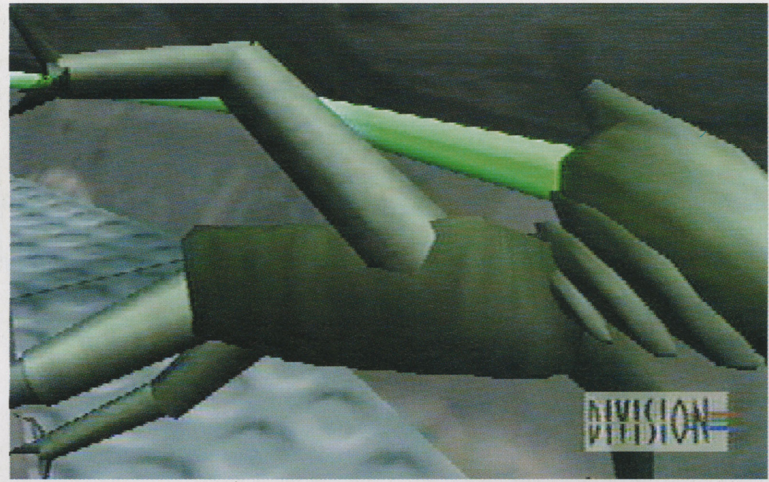


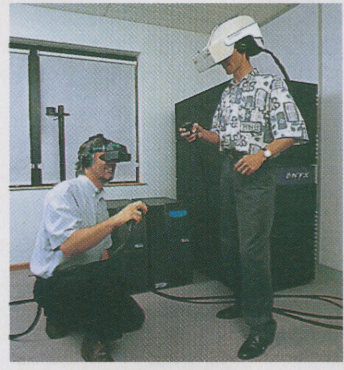
Virtuality's *Virtual Boxing* is fun to play, but it's even funnier to watch others playing

AOU line-up

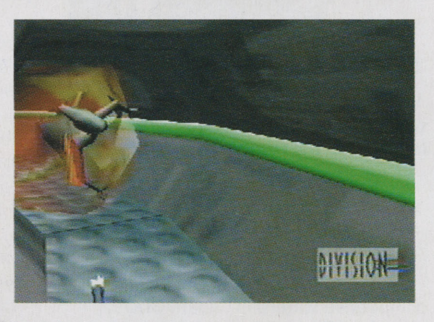
By the time you read this, Edge will have already visited the Amusement Operators' Union show – Japan's first big coin-op event of the year, scheduled for February. 22nd-23rd. The games expected to show up are as follows...

Sega: *Daytona GP, Jurassic Park, Star Wars, Columns III, Hard Dunk, Virtua Soccer*
Capcom: *Super Street Fighter II X*, new F1 racing game
Konami: *Gradius 4, Parodius '95, Golfin' Greats*
Toaplan: *Snow Brothers 2*
Taito: *Ray Force, Light Bringer*
Tecmo: *Tecmo World Cup '94*
Irem: *Geo Storm, Best Eleven*
Namco: *Final Lap R, Nebulus Ray, Tinkle Pit, Godzilla Wars*
Jaleco: *Super Striker*
SNK: *Soccer Brawl 2, Top Hunter*
Sammy: *Dyan Gear, Twin Eagle 2, Deadly Sport*
Data East: *Fighter's History Dynamite, Flying Power Disc*





Division's Provision 100 VR system (above), shown behind closed doors



Division's demo (above and top) offered unparalleled graphics for low-cost VR

← claimed to be the most powerful VR machine available. And a quick go 'inside' their alien-infested demonstration game was enough to prove them right – this was serious power **Edge** could get used to: 160 million pixels/sec, 300,000 Z-buffered polygons/sec, 300,000 Z-buffered spheres/sec. The cost? A surprisingly affordable £11-12,000. Expect to see more on this soon.

Finally, Alternate Worlds Technology (AWT) introduced some VR gear that turned a few heads, but not for the right reasons. Based on low-cost PCs, these unattractive multiplayer VR machines almost looked like they'd been welded together in a garden shed before being given a fresh lick of paint. To make matters worse, the VR experience which AWT had the gall to present was called *Wolfenstein VR* – yep, a new version of the crusty old PC shareware title complete with a virtual reality headset for that truly immersible 3D experience. Looks like Arthur Daley has given up the dodgy motors and is now flogging VR kit.

Fortunately, *Doom*, the saviour of the cowboy VR trade, is already on the way...

Who is it?

For years, this man ruled the Japanese videogame industry. His company – which started life in 1955 producing coin-operated kids' rides – dominated the market thanks to a small, cute, coin-op character. He finally met his match in 1989



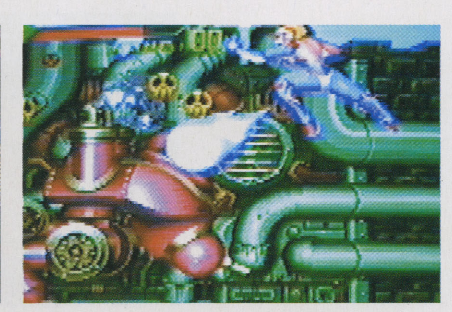
This VR system from AWT ran (ahem) *Wolfenstein VR*



Data East's *Spin Masters* is that rare beast – a Neo Geo game that isn't a beat 'em up



SNK's *Art Of Fighting 2* has better graphics, more characters and improved gameplay



***Ultimate Force* from Konami allows two players to gang up against the computer**



3DO Japan sets date

Another country, same machine. But will the Japanese go for Trip's 'paradigm shift'?

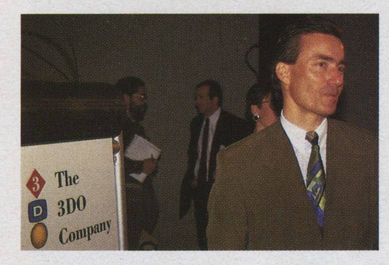
it is...

Masaya Nakamura, founder of Namco (see Edge 8). *Pac-Man* made Nakamura the most powerful man in the Japanese coin-op industry – a status he lost to Hiroshi Yamauchi, head of Nintendo

3DO gets personal

If 3DO's latest plans see the light of day, 3DO hardware will soon be compatible with PCs.

The 'PC Card' will allow 3DO (and PC CD-ROM) software to run on PCs from the 3DO drive and CD-ROM software to run on 3DO. If that wasn't enough, *Windows* will also be supported, and there are plans to develop a similar card for Macintosh computers. No manufacturing details have been released as yet.



Trip Hawkins: 'Japanese development is crucial to the success of 3DO'

After a rather cheerless US launch, 3DO has fearlessly paddled out into the even more competitive waters of Japan. 3DO Japan was incorporated in July last year, providing Matsushita (Panasonic) and Sanyo – the two Japanese 3DO hardware licensees – with the vital technical and marketing support they need. The first Panasonic 3DOs are expected to ship on March 20.

President of the new company Akifumi Kodama takes on the responsibility of supporting the existing Japanese licensees while generating more confidence in Panasonic's home market. Until now, most 3DO development has been concentrated in the US but it was considered crucial to 3DO's success that Japanese-developed software would be ready in time for the launch.

At present, 17 Japanese 3DO titles are scheduled, varying from sports to interactive adventure titles. The Japanese games press has noted the surprising lack of RPG or arcade action titles, but 3DO insist that with companies like Capcom, Human, Konami, Namco and Bandai coming onboard, these won't be far away.

It seems that all US 3DO software will be compatible with the Japanese system, whereas the high level of Kanji (Chinese characters) in some Japanese 3DO titles will prevent them from running on a US machine. Here is the full list of Japanese titles:



March
Chiki Chiki Machine Race (Future Pirates)
Ultraman Power (Bandai)
Pebble Beach (T&E Soft)
Fireball (Japan Data Works)
Kyoto Mystery (Pack-in Video/Panasonic)
LIfe Stage (Microcabin/ Panasonic)
April
Doctor Hauzer (Riverhill Soft)
Tetsujin (Synergy/Panasonic)
Nontan To Issho (Victor Entertainment/Panasonic)
Takeru (Fun Project / Panasonic)
Theatre Wars (Hakuhodo Multimedia Soft/Panasonic)
Virtual Quest (Ask Kodansha)
May
Toki O Koeta Tegami (Thinking Rabbit/ Panasonic)
The Mask Of The Black Death (Humming Bird Soft/Panasonic)
Professional Mah Jong Goku (Ascii/Panasonic)
Shogi Special (Ascii/Panasonic)
Burning Soldier (Pack-in-Video/Panasonic)





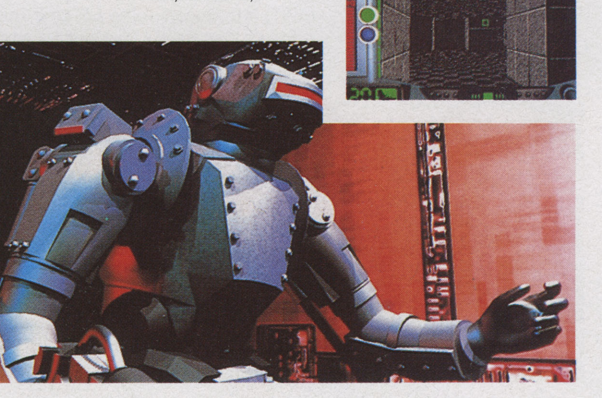


Murder At Kyoto Kurama Sanso* (top) – a digital video whodunnit, *Fireball* – 3D pinball game from Japan Data Works (centre), and *Big Waves At Pebble Beach





***Wacky Races* (top) and *Alone In The Dark* clone *Doctor Hauzer*, from Riverhill Soft**



Synergy's first 3DO project will be *Tetsujin* (*Iron Man*) – an action adventure with rendered visuals (above) and a 3D perspective (inset)

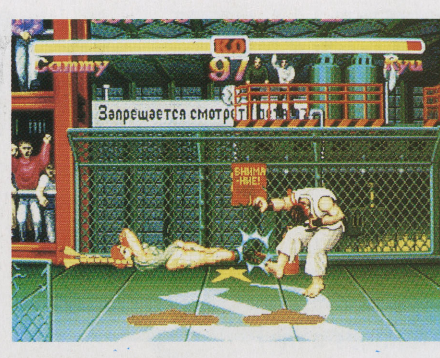
Japanese go **32bit**

The decision by established Japanese games developers like Capcom to support the 3DO, Saturn and PS-X has given the new machines valuable credibility

The Japanese are going 32bit. Extending their recent commitment to 32bit platforms like Fujitsu's Marty, Capcom have decided to develop software for PS-X and 3DO. According to Japanese sources, the first Capcom software will be an upgraded version of *Street Fighter II*, with other arcade translations to follow depending on sales. This news comes after a host of announcements concerning Japanese companies like Namco and Konami getting involved with hardware firms other than Nintendo.

Likewise, Bandai, who are also traditionally loyal Nintendo licensees, have decided to start supporting emerging 32bit systems. Starting with the gloriously kitsch 3DO game *Ultraman Power* in March, Bandai will go on to develop software for both Sega's Saturn and Sony's PS-X. Konami, on the other hand, have announced PS-X development but have not yet made public any 3DO plans. It's expected that their first 3DO title, possibly a conversion of *Gradius* or *Pop 'n' Twin Bee*, will surface towards the end of the year.

'Wait and see' development is still the biggest problem that the 3DO faces in Japan. Despite the company already having one title in development, a Japanese spokesman for Namco recently told **Edge**: 'This will not be an easy platform for us.'





***Super Street Fighter II* (top), and *Ultraman Power* (above) – both on the way for 3DO. Which one would you choose?**

Jaguar hits **problems**

Although Atari's Jaguar got off to a flying start in the US, the 64bit console tripped up on its first visit to the UK

Atari's Jaguar has had a rather inauspicious beginning in the UK. The firm had hoped to whet appetites by shipping in several thousand consoles in early December, but only managed to get its hands on a few hundred machines. Deliveries only reached stores on Christmas Eve, and the vast majority of customers who had placed orders were let down.

HMV and Virgin both got less than 100 units each. HMV games manager **Gerry Berkley** told **Edge**: 'I have to say that it wasn't particularly well handled, and in the end it was hardly worth the effort. There's been a lot of bad feeling created. I don't think Atari have done themselves any favours.'

So how did this unfortunate situation come about? Atari marketing manager **Darryl Still** explains: ...ention was ...ially to supply all ...hose die-hard games fans who would not be able to wait for the ...fficial launch. [But] the excellent coverage we received in magazines such as Edge left us in the middle of mass-market consumer demand three months before launch. Such was the demand generated that even had we received the full amount we would still have been very short of what was required.'

Jaguar CD – the fluffy pink toilet seat cover will be available as an optional extra

Darryl isn't worried by this situation – rather, he sees it as testament to Jaguar's popularity: 'All the problems were caused by the immensely positive way that the product was received by the consumer and we look on this as extremely exciting for the future.'

More problematic for Atari is the news that initial stocks included some faulty machines. 'We've had a few back since Christmas,' says Gerry Berkley. 'I believe there's a problem with the lead. It's a difficult situation because we'd like to exchange them but there are no stocks in the country.'

Darryl Still vehemently dismisses such reports: 'I think that maybe there are some parties who would benefit from incorrect 'Jaguar unreliable' stories spreading,' he says. 'We've had a grand total of seven machines returned, of which one was due to a faulty RF cable – 49p from Tandy. All these have been exchanged by Atari.'

The official bells-and-whistles UK launch of the Jaguar will take place in the Spring, and Atari are confident it will be a success.

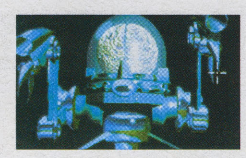
BUZZ words

saturn

i'm gonna get me a saturn i am it'll be great because they're as fast as i don't know what cor i'll be playing daytona in me front room soon although my house is a bit on the small side i mean those things are planets you know bloody great things they are i'll have to get me a pretty big extension it'll probably take up the whole garden and next door's that neighbour'll moan i expect miserable sod maybe i'll wait a bit those japanese always make things smaller in a few months...

TXE Multi System joins the **fray**

The war to set a standard for multimedia is far from over. Edge examines a new alliance...







TXE already has a number of titles in development: *Dtox* (top) is a shooter with rendered graphics; *Team Suzuki* (middle) the acclaimed racing game; and an enhanced version of the PC game, *Moonstone* (bottom)

The fight to establish a standard for mass-market multimedia is already far more complicated than the VHS vs Betamax battle. Surely there isn't room for another platform?

Well, yes – according to MSU, the company set up to develop and exploit the potential of the chipset that so nearly made it into the Konix console.

With a Taiwanese hardware manufacturer as their main client, the MSU crew has been beavering away for the last 18 months developing the SlipStream ASIC. They have also been designing hardware and software to integrate SlipStream into a new consumer product – the TXE Multi System – and are close to signing licence/development deals with a couple of multinational corporations

On its own, neither MSU nor its client TXE expect the first SlipStream product to become the standard multimedia platform. Rather, the Multi System is just the first incarnation of a broader standard that could evolve, based on the Slipstream ASIC.

MSU has no plans to release its own multimedia player – its core business is design and development for clients, and will soon be licensing its technology as the major building block in 'a new generation of consumer electronic products'.

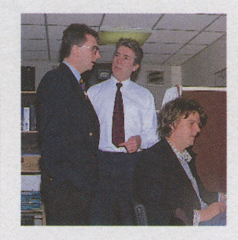


The TXE Multi System is the first multimedia platform to utilise MSU's SlipStream RISC technology – and probably won't be the last

'We're more than an R&D company,' **Wyn Holloway**, MSU's managing director, explains. 'Our real business lies in designing machines for other people, if that's what they want, or we can license the chipset and provide leading-edge software expertise.'

This is borne out by the fact that MSU's proprietary error-correction software in the CD drive interface is already attracting serious attention...

The Slipstream ASIC has been designed so that it can be incorporated into a wide range of products – from add-on cards to complete players – and its architecture is deliberately open-ended, designed to interface with major →



Wyn Holloway (centre) pioneer of the Konix cause, chats to coder Keith Goodyear. Dave Eddy (seated) is MSU's texture-mapping hero

Attract mode

When it comes to snazzy graphics, Edge is as guilty as most in the glazed expression, slack-jaw drooling stakes.

That's why we have Attract Mode: it gives us a perfectly good excuse to sit and gaze in awe at game intros, under the pretence of picking the best for your personal edification.

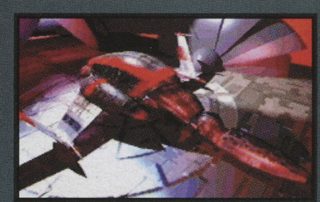
This month *Scavenger 4* (p72) won hands down...



1 Fade to interior. The camera pans around video screens displaying talking heads. Close-up as they grimly explain the plot: an interplanetary datagrid has become self-aware and has taken over vital mining and production facilities



2 Only one craft is powerful enough to destroy the datagrid's base: Scavenger 4. Cut to a holographic representation of the craft as it enters the Kri-Nor system. Cut to exterior – slow track in on the Scavenger 4 hangar



3 Cut to hangar interior: close-up and pan around the Scavenger 4 ship. It is a sleek and shiny craft; a symbol of harnessed power. As its reactors hum into action, they emanate a blue light which illuminates the hangar

Enter MSU

Flare's ASIC chipset that was destined to appear in the Konix machine was verging on its first revision when it all went horribly wrong for Wyn Holloway and his Konix Multisystem.

After the demise of the Konix console, Wyn found a Taiwanese client for the new Multi System product and assembled a team that includes marketeers, system programmers, games programmers and hardware experts.

MSU Ltd was born, with a plan to create a platform for licensing to hardware manufacturers. Three more revisions of the ASIC and a prototype of a new multimedia delivery platform were completed in time for WCES... now the MD of Flare, Martin Brennan, is working fulltime for MSU.

MSU has taken Flare's technology a lot further forward – and it looks like they've solved problems like FMV and error correction that others are still wrestling with.

Within a few months we'll know whether the licensing deals have materialised or faded away – Multi System *could* be the start of something big.

← processors and accept upgrades directly. As an example, the memory layout is designed to accept the MPEG chip: 'Within a year, we'd like to build MPEG into the TXE Multi System at the same £399 price point,' says Holloway.

Due to appear this autumn, TXE is a 32bit games machine and then some. You'll get CD+G, proprietary FMV, karaoke with two mikes and voice manipulation. And it also plays your audio CDs without your having to turn the telly on.

As far as the Taiwanese TXE company is concerned, it's the karaoke that's the strong selling point – the Multi System was commissioned to be an attractive alternative to dedicated karaoke machines aimed at the Eastern market. That said, its audio and games delivery capabilities should make it a contender as a dedicated multimedia machine in the less karaoke-obsessed corners of the globe.

Eight titles for the Multi System are almost complete, most being enhanced versions of games that have earned acclaim on existing platforms – like *Team Suzuki, F16 Combat Pilot, Lotus Turbo* and *Robocod*. On-board FMV and remastered CD-quality soundtracks give real gloss to these launch titles.

With the system's capabilities, some impressive entertainment software could be written for it – the hardware offers programmers a host of powerful tools to achieve in a couple of lines of code what would otherwise require an entire sub-system of instructions: like Gouraud shading, rotate and zoom.

'We've tried to design in as many functions as possible, without limiting the programmer – when you design a machine like this, the beauty is that a programmer walks in with something you wouldn't have thought it could do,' Holloway explains. A typical example is the fact that there are no built-in hardware sprites. Instead, there are four hardware planes of graphics and the system supports blitting in front of and behind each of those four planes.

But who, exactly, is writing for it? Holloway freely admits that Multi System development kits aren't yet in the hands of third-party developers – mainly because MSU hasn't started talking seriously with developers yet.

A dangerous approach, perhaps, given that the Multi System starts shipping in eight months' time. However, Holloway points out that the system allows existing PC CD-ROM products to be converted to the Multi System in a matter of weeks, and that: 'We're in the final stages of a negotiation that will lead to some very exciting releases – but I can't tell you about that now.' E

Multi System tech specs

Main CPU: 386 running at 25MHz and SlipStream 32bit custom RISC

Custom chips: 32bit graphics processor

Memory: Custom memory controller allows direct memory access from CD; DSP and 386 cached. 8Mbit DRAM on 32bit bus to memory controller, 1Mbit ROM on 16bit bus to memory controller.

Graphic display: Two modes – 65,536 colours max; 8bit RGB in palette mode. Slipstream ASIC – 16bits per pixel; synched for mix with external video

Resolution: 256x200

FMV: Proprietary FMV – best quality in 192x128 window

Animation: No hardware sprites: can blit in front and behind each of four hardware planes. Gouraud shading, texture mapping, zoom, rotate. Capable of drawing 96 million pixels per second

Sound: Line out: DSP, 25Mips, 16bit+16bit Bitstream DAC
Line in: input mixer and quality ADC

Release: Autumn '94 in Japan/Europe

Price: £399



TXE has comprehensive controls for CD audio – including echo and a six-channel equaliser

Where is it?

This is where some of the latest advances in Digital Video encoding and decoding are taking place. The results of the hardware engineers' labours is a dedicated karaoke system for use in Japan that can store two hours of video on CD



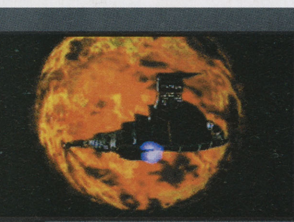
4 **Cut to rear of craft. The exhausts produce twin jets of fiery power. The Scavenger 4 slowly lifts off the deck and hovers for a second before launching itself into the wild, red yonder. The view pans around as it becomes a dot on the horizon**



5 **Cut to exterior: static POV shot. The Scavenger 4 hurtles towards and past the camera, leaving the hangar and cityscape in the distance. The sky is a flaming dance of holocaustic proportions.**



6 **Cut to rear of ship: close tracking shot. We follow the fighter as it powers through an unearthly sunset. Cut to a position far above the ringed planet: the Scavenger 4 zooms past the camera towards a rendezvous with its mothership**



7 **Cut to docking bay as the fighter touches down. Gunning its engines, the mothership sails past and enters hyperspace. Cut to exterior of red planet as the behemoth appears. Scavenger 4 heads down towards the fiery globe. Game on...**

A **new** reality... RenderWare

***RenderWare* is a revolutionary new software solution for graphics – 3D may never be the same again...**

it is...
Pioneer's Digital Design Centre research facility in Bristol. Engineers there have designed a Digital Video system three times faster than the standard MPEG, using high-density CDs. **(See page 44)**

HardWare

***RenderWare* really flies, even on the minimum PC configuration – a 386SX with 4Mb RAM running *Windows 3.1*.**

Of course, it gets progressively better as you unleash it on faster CPUs – on a 486DX running at 50MHz, for instance, typical performance at the application level is 40,000 polygons a second.

That figure was worked out using a 4K polygon model, transformed, lit, clipped, painted, and software double-buffered to the screen in a 400x400 viewport.

Feed *RenderWare* into a Pentium and you can expect 100,000 polygons per second, and half as much again performance-wise on a PowerPC.

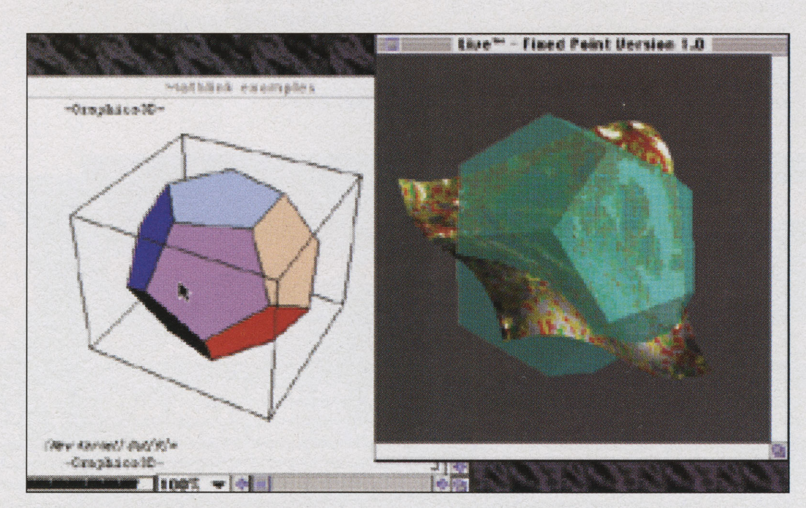
Virtual reality just got a whole lot more real. Developers working on programs for a host of applications – multimedia, home shopping, games, scientific visualisation, training – are about to get wind of a software-only system that delivers powerful, real-world 3D modelling. On ordinary computers.

Soon you'll be viewing the kind of 3D modelling that, until now, you wouldn't have been able to get close to without spending a fortune on dedicated hardware. Sure, if you own a £150,000 dedicated machine you can run a remarkably realistic flight sim. If you have a justifiable need, a £15,000 workstation can deliver the goods. If you are really pushed for cash, you could get away with spending as little as £6,000 on hardware to get passable real-world 3D modelling. A few weeks ago, all that changed.

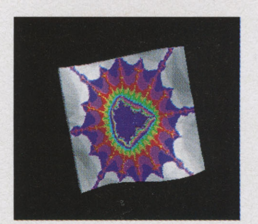
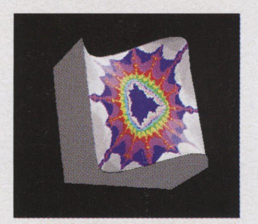
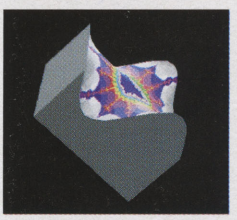
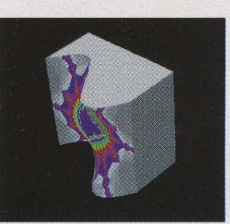
Criterion Software, a UK subsidiary of the multi-billion Canon Inc, have just announced, to general disbelief, a software solution to the problem of realtime 3D modelling. It's called *RenderWare*. Hard-nosed PC and IT correspondents at the launch couldn't believe that what they were seeing was being generated in realtime on a 486 portable PC. One journalist was only convinced that *RenderWare* was for real when he saw the endorsement from Paul Allen, co-founder of Microsoft.

And there'll be tears before bedtime in some quarters as the news filters out – Byte magazine half-jokingly predicted suicides amongst one VR team that was just coming to the end of a six-figure spend on a hardware solution to the same problem: displaying 3D graphics with a convincing real-world feel.

RenderWare really has to be seen to be believed. After the shock of seeing 40,000 polygons a second generated in realtime on an unenhanced 486 sinks in, you begin to get a grip on the potential. A new generation of software is around the corner: games that don't restrict you to a single head position; interactive multimedia programmes that let you explore your environment; 3D →



The first practical application of *RenderWare* is *Live* from Oxford-based True-D Software. Run in conjunction with Wolfram Research's *Mathematica*, it enables the user to visualise and manipulate complex mathematical formulae in realtime

This sculptured block is a visual representation of a mathematical sine function. A Mandelbrot image is texture-mapped on top and the whole thing can be manipulated realtime, via the mouse. Running under *Windows*, this demonstration of *RenderWare*'s power is impressive, but a more complex, fullscreen image would have been even more convincing

SoftWare

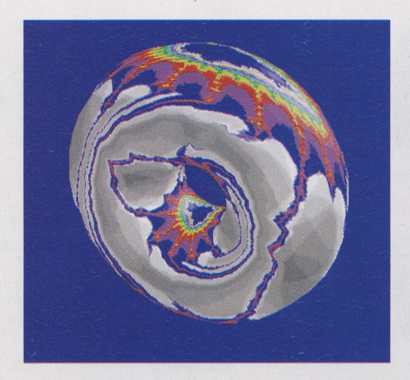
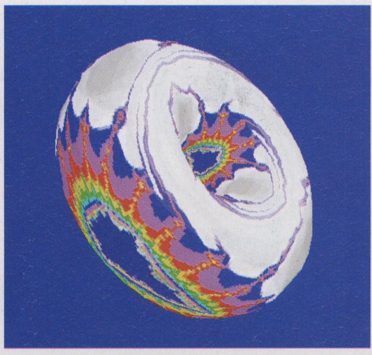
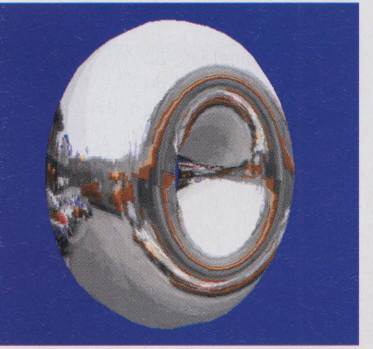
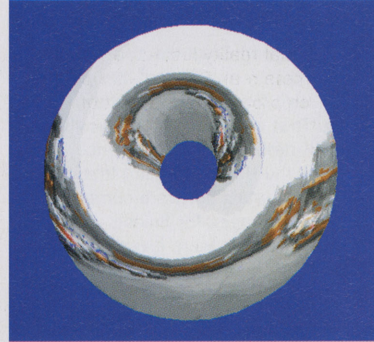
Despite the low set-up cost, games developers are likely to adopt *RenderWare* a little more slowly than software houses working on high-end applications.

Criterion are involved in ongoing discussions with games developers, however. You can confidently expect to see *RenderWare*-enhanced games within a year – on the PC and Mac, at the very least. The first product, already in development for Virgin Interactive, is said to be 'pushing the boundaries of what's possible in multimedia entertainment.' Hex (*e-Scape* on CD-i) are developing an audiovisual experience which draws on the video and sound in the Virgin Music portfolio. There is a game element, but in the sense of exploration.

Make no mistake, this is exciting technology. Within three years, interactive photorealistic graphics could be within the grasp of the *RenderWare* system. Adam Billyard, Criterion's Technical Director, asserts: 'I have every confidence in *RenderWare* providing graphics that are indistinguishable from photographs. I can't see why it can't be done.'



The *RenderWare* teleshopping demo allows you to visit a 3D mall: you can walk around objects, turn them and access their prices. Britain could soon be a nation of virtual shopkeepers

A torus is clothed with the Mandelbrot image; but *RenderWare* can just as easily make it reflect its surroundings, with no reduction in speed – even on a 386 PC

interfaces to applications such as spreadsheets; home shopping systems that allow you to interact with the products on offer; and training packages that can model a product which is not in full production.

Currently, there are around half a million 3D workstations in the world. *RenderWare* brings their capabilities to millions of PCs and will almost certainly be running on the next generation of dedicated games consoles. What's more, game and application developers won't need dedicated 3D programmers to bring this new realism to their products (at the moment, there simply aren't enough good 3D programmers to go round). *RenderWare* is easy for non-3D specialists to get to grips with: all you need is C programmers and a grasp of the *RenderWare* scripting language.

What's more, *RenderWare* is processor and hardware independent. Own a *RenderWare*-equipped application and you can take it with you when you buy a machine with a more powerful CPU in the same family – your 3D modelling just gets faster. As the specs of mass-market machines improve, so will *RenderWare* – it works in 24bit colour already and optimises down for 8bit displays. Nor is *RenderWare* operating system-dependent. Although it launched on the Mac, PC and Sun, ports to other platforms will be 'easy', according to its creators. Criterion will expect a royalty on every software unit with *RenderWare* graphics, but that could add less than a dollar or two to the price you pay for a mass-market game – or the publisher might avoid passing on the cost altogether and just trim their profits a tad.

RenderWare is not an application; it's a component, designed to exist within applications. It doesn't take over the machine; in effect it coexists with 2D graphics as a service module, on which the application developer draws. It's well suited to immersive applications ('virtual reality', in other words), so you can interact with objects – wandering around a modelled room, for instance, changing your viewpoint and meddling with things.

And you get all these benefits on a 'standard' machine, with no special hardware. The faster your CPU, the better *RenderWare* performs, but what runs on a Pentium will also run on a 386SX with 4Mb of RAM. Believe it. *RenderWare* will do for 3D graphics modelling what PostScript and ATM did for computer typography and printing. And Criterion promise photo-realism within three years... E

Data stream

Number of Mega Drives sold in the US in 1993: **5,900,000**
Number of Mega Drives sold in the US from Sept 1 to Dec 31: **3,000,000**
US marketing budget for *Sonic 3*: **$20 million**
Sales of Atari's Jaguar in just two US cities – New York and San Francisco – before Christmas: **27,000**
Estimated US sales of Panasonic's REAL 3DO multiplayer before Christmas: **8,000**
Trendiest T-shirt slogan at the Las Vegas CES: **3DOA**
Company that had them printed: **No-one's telling**
Number of 3DO titles currently available: **18**
Number of 3DO titles expected in 1994: **100**
Predicted total number of videogame carts to be sold in the US in 1994: **112,000,000**
Retail sales of Nintendo hard- and software in the US for the year ending March 31, 1994: **$4,287,000,000**
Estimated value of Nintendo hard- and software sales in the US for year ending March 31, 1996: **$4,915,000,000**
EA's best-selling Mega Drive game ever in Europe: ***FIFA International Soccer***
Sega's share of the total UK software market in December 1993: **18.3%**
Sega's share of the total UK games CD market in December 1993: **36.4%**
CD formats' share of the UK games market in Dec 1993: **2.6%**
Global turnover of Acclaim in one *Mortal Kombat*-inspired quarter: **$127.4 million**
Total value of the UK toy market: **£1.87 billion**
Interactive entertainment's share of the UK toy market: **40.22%**

Silicon Graphics: **show**ing off

The 3D revolution is now well under way and Silicon Graphics want a (bigger) piece of the action. The company recently held a conference to show off their wares to UK games developers. Edge was there

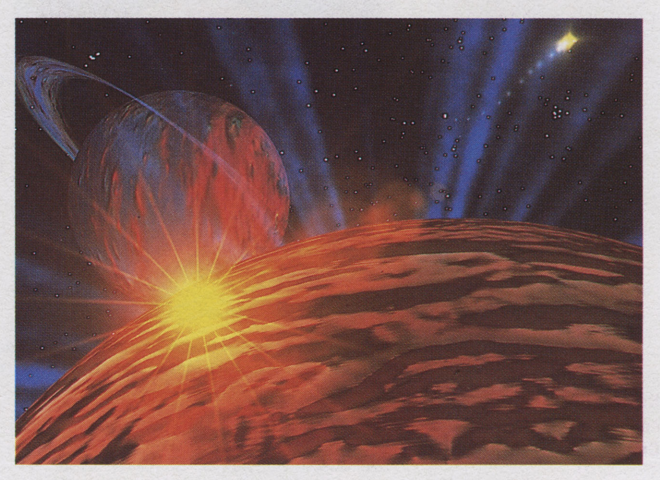
To Silicon Graphics, the games industry must seem like one huge flower ready for the picking. That was the impression given at the UK development conference hosted by the US-based giant last month. Competing software companies producing packages for Silicon Graphics hardware were given the chance to show off flashy graphic demos to an audience of artists, programmers, and industry bods, while Silicon Graphics sat back and waited for the orders to flow in.

This PR exercise was part of SGI's mission – lent credence by the Project Reality link-up with Nintendo – to entice the design talent of the videogames industry into using SG hardware. Artists and designers from games companies not already bitten by the SGI bug were wooed by major-league graphics software players like SoftImage, Alias and Wavefront, who flaunted stunning images in front of the audience of enthusiastic onlookers.

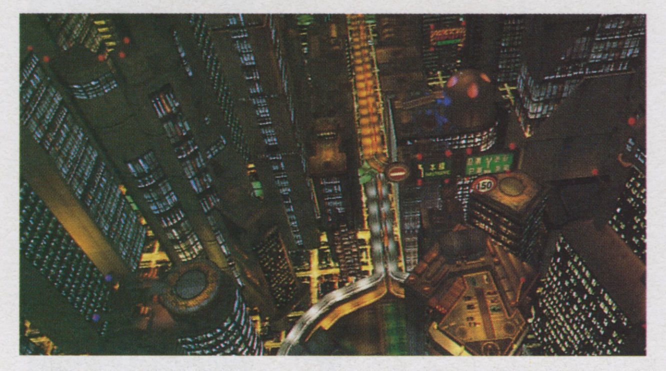
3D graphics have become a serious business for games companies, especially with five-figure price tags on most graphics packages for SGI hardware. However, Autodesk's *3D Studio* – the PC alternative to SG software – is claimed to have an estimated 80% of the features of packages like Alias' *PowerAnimator*, at 20% of the cost. So it's no wonder that some games companies needed convincing. What advantages do the latest software developments give artists with SG workstation technology?

Alias' *PowerAnimator V5.0* was one of the packages at the leading edge of digital effects technology. **Paul Franklin**, Psygnosis' lead artist on *Scavenger 4*, talked about the techniques used to model and render the landscapes and animations in the game, while demonstrating the game's beautiful visuals with an animation of the end of game boss (see cover). 'From start to finish the whole project was completed in five months,' Paul enthused, 'and there's 60,000 frames of animation in there.' An impressive enough timescale to cause jaws to drop, and an indication of the rendering speed SG Indigos can muster.

But rarely does a games company bet solely on a single package. SoftImage are also well established among the gaming fraternity, with no less than 30 companies now using →



Effects like lens flare and glows can be created with Silicon Graphics machines. This image was rendered using Alias' *Digital OptiF/X* tools



Sega's latest AS-1 ride, the beautifully detailed *Megalopolice*, was completely rendered using SoftImage's *Creative Environment* software

Onyx power



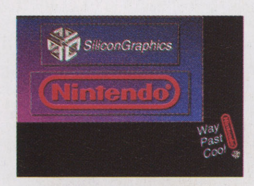
A Silicon Graphics Onyx Reality Engine was the machine kicking out demonstrations at the conference, but an even faster Onyx Reality Engine² (above) was used at the CES.

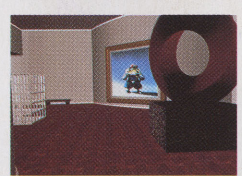
This beast includes four R4400 chips, each running at 150MHz, and delivers an astonishing 2 million t-mesh polygons per second, or 930,000 texture-mapped polygons/sec. And all for a paltry $100,000...

Project Reality

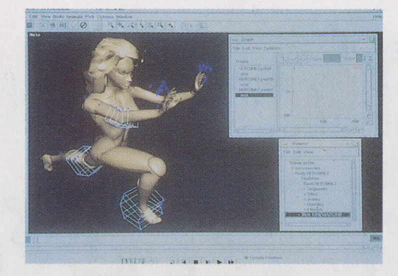
Silicon Graphics' proposed specs for Project Reality were displayed on a screen at the conference, but it is likely that these will take a different form next month. In polygon-speak, 100,000 a second is certainly less than the figures associated with Sega's and Sony's machines, but who would be hasty enough to start comparing numbers at this stage? Not Edge. Specs follow...

CPU: R4200 MIPS 100MHz RISC processor
100 MIPS (millions of instructions per second)
3D Graphics: 100 MFLOPS (floating point operations per second)
100,000 polygons per second
Realtime anti-aliased 3D texture-mapping
Resolution: Hi-res HDTV compatibility
Colours: 16.7 million
Sound: CD Quality





'Way Past Cool' is the rather hapless slogan Nintendo of America are bandying about. As for those SG images...





Wavefront's *GameWare* (top) was demonstrated by this impressive *Street Fighter II*-style animation

← their *Creative Environment* software, responsible for such astonishingly detailed visuals as those seen in Sega's new AS-1 ride, *Megalopolice*. SoftImage's *Creative Environment* was also the modelling tool used for the polygons in Sega's *Virtua Racing* and the forthcoming texture-mapped racer, *Daytona*. If anyone has the games to back up the product, it's SoftImage.

Finally, Wavefront exhibited suitably tailored examples of the results possible with its *GameWare* graphics software, showing a *Street Fighter*-like demo and a stunning reel from *The Devil's Mine Ride* – a computer-generated ride simulation created by Belgium-based company *Little Big One* (also responsible for *Chaos Control*'s SG renderings). This fantastic virtual rollercoaster was an indication of the amazing results that can be achieved in three months – if you happen to have access to about nine SG workstations. Their presentation was rounded off by Arc Development's Paul Walker demonstrating the company's forthcoming *GameWare*-produced CD project, *First Contact*.

While it was hard to sum up the proceedings in a single word, the general message at the conference was that Silicon Graphics hardware will save developers time and trouble. And with companies like Capcom, Konami, Namco, Hudson Soft, EA, Sega Europe, and just about everybody else already using SG technology, no doubt we'll be seeing some beautiful graphics over the coming years. Now, if only Silicon Graphics could bring out a gameplay designer... E

Datebook

March

ACME Show 17–19 March, O'Hare Exposition Center, Chicago, US. Huge US coin-op show. For more details call the organisers on: 0101 (708) 333 9292.

ICA Talk Saturday 12 March–Sunday 13 March, at The ICA, The Mall, London SW1. Conference on 'The Body In The Virtual World'. Guest speakers include Sadie Plant, cultural commentator and protagonist of cyberfeminism, and performance artist Linda Dement – who scans images of her body into her CD-ROM work, *Typhoid Mary*. Tickets £15 one day, £20 for both days. For further details call: 071-930 0493.

April

International Computer Show Friday 22 April–Sunday 24 April, Wembley Exhibition Hall. A good place for bargains on all things computer-based. Open 10:00–6:00 Fri–Sat, 10:00–4:00 Sun. Tickets £7 adults, children under 10 £5. Advance ticket discount. Call: 0222 512128.

European Computer Trade Show 10–12 April. Open from 9:30am to 5:30pm at the Islington Design Centre, London. For further details call: 081-742 2828.

Database Systems Exhibition Tuesday 19 April–Thursday 21 April. Olympia Conference & Exhibition Centre, Hammersmith Rd, Kensington, London. Contact Interactive Exhibitions on: 081-541 5040.

May

IALTEX '94 Tuesday 10 May–Thursday 12 May, Thorpe Park, Surrey. A chance to see the latest simulation techniques, merging audiovisual technology with the concept of virtual reality. For further information contact Sandie Harris, or Ken Mather public relations, on: 061-236 0677; or Worlds Fair Exhibitions: 061-624 3687.

June

Multimedia Exhibition Tuesday 7 June–Thursday 9 June, Earls Court, London. The place to be for all things multimedia. For more details call the show organisers on: 081-742 2828.

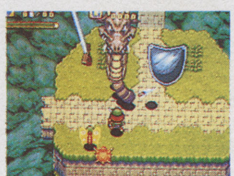
Computer Solutions Exhibition Tuesday 7 June–Thursday 9 June, Scottish Exhibition & Conference Centre, Glasgow. For more information contact show organisers Trident Exhibitions Ltd in Devon on: 0822 614671.

Show organisers: if your show isn't listed here, it's only because you haven't told **Edge** about it. Do so on 0225 442244, or fax us on 0225 446019, or send details to **Datebook, Edge, 30 Monmouth Street, Bath, Avon BA1 2BW**

This **month** on **Edge**

Late news, rumour, and strange events which shaped **Edge** 7





New MD projects: *Outrunners* (top), and a smart *Zelda* lookalike from top coders Gau

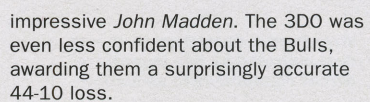
Sony PS-X news: the machine is reported to have a triple-speed CD drive, with four or five megabytes of RAM, and will cost about £300. Development machines will ship in March. Sony are keen to get the machine out around November but the latest rumours indicate that it might be pushed back a couple of months to allow software more time.

Other PS-X news concerns Capcom. After Namco and Konami joined the fray, Capcom have announced they will also be developing software for Sony's machine. First title? What else, but an updated version of their ten million selling *Street Fighter II*. Apparently Capcom's personal computer software division will handle the project alongside a 3DO version and more titles for the FM Towns Marty.

One of the best phone calls we received was from a doting mother who wanted to buy her son a Silicon Graphics machine: 'I realise they're over £5,000,' she explained, 'but he's very keen...'

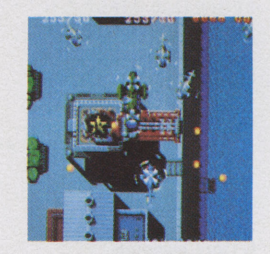
While visiting Virtuality this month to check out their latest Series 2000 gear, an **Edge** representative stole a glimpse of an unusual VR headset lying around. Surely nothing to get excited about: after all, it's rather like seeing a stray hubcap at a branch of Kwik Fit. But a VR helmet with 'Sega' on the side? Sega's deal with Virtuality has been public for the last eight months, but specifics of the nature of the deal have been non-existent. A Saturn VR interface, perhaps?

Sunday 30th, and **Edge** attends a Super Bowl party at Planet Hollywood – sadly the one in London, not California. While the Dallas Cowboys gave the Buffalo Bills a thorough kicking, finishing the victors at 30-13, EA had a 3DO on show, running the very impressive *John Madden*. The 3DO was even less confident about the Bulls, awarding them a surprisingly accurate 44-10 loss.

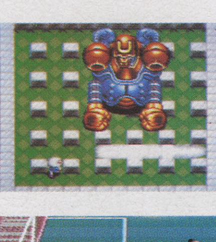


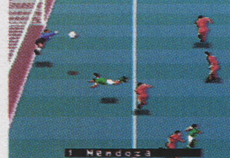
High interest currently surrounds the AOU (Amusement Operators' Union) – the big Japanese coin-op show that takes place in late February. Mainly because this is expected to be the venue where Nintendo will re-enter the arcade market with a demonstration of their Project Reality coin-op hardware. And the fact that **Edge** is scheduled to attend Nintendo's UK headquarters at exactly the same time to hear about Project Reality plans gives adequate credence to this.

Also expected to make its debut at AOU is *Super Street Fighter II X*. This is obviously the biggest news for beat 'em up fans all over the world, although arguably this is pushing the *Street Fighter II* 'update' a bit too far down our necks. Apparently the game offers →



Ving's latest Marty shooter is the PC-E classic, *Ultimate Tiger*





SFC: *Super Bomberman 2* (top) and Capcom's *Soccer Shootout* – nice Mode 7 in this one



This shot from 3DO *Theme Park* shows Bullfrog's Silicon Graphic-rendered rollercoaster in full flight – a feature shared by CD versions



***Star Trek: The Next Generation* on 3DO promises elaborate visuals and fully rendered, lip-synched characters. This purple chappie, we hasten to add, is *not* Captain Jean-Luc Picard**

← faster speed – something *SSFII* is badly lacking – new special moves, and Super Combos. These are likely to be more complicated than your average two or three hit combo, and will enable players to climb their way out of tricky situations. Certain combos are designed to enable players to win a losing game.

There were also rumours that Capcom would be releasing a new F1 racing coin-op at AOU, which isn't surprising when the company has been involved in the racing world since 1989 and now has its own Formula 3000 racing team. Will Capcom be entering the Namco and Sega super league with a brand-new 3D graphics system, or simply an update of their five year old vertical scroller *F1 Dream*? Well, all that Silicon Graphics development must come to something, surely? Let's hope the Osaka-based company doesn't get lost in the coin-op market. After all, that's what placed the company where it is today.

25th January and a 3DO appears in **Edge**'s local small ad paper, Trade-It. Another happy customer...

Mortal Kombat II seems to have caused a few problems for arcade visitors around the country. It seems there are different versions of the game floating around all with varying degrees of death and brutality. Apparently, Midway shipped in up to six different versions of the ROM software such as version 1.0 (only one character has two death moves), 1.1 (most of the fatalities), 2.4 (friendship moves) and 3.0 ('babalities' plus two hidden characters).

The ridiculous upshot of all this is that arcades with older versions of the game are rapidly being shunned and it seems some arcade owners are being left out of the picture. Gore fans might want to check out version 3.0 as fast as they can – with Jax pulling off arms and breaking backbones, the long arm of certification might be hot on Midway's trail.

Finally on the coin-op side, news has arrived that Irem are pulling out of the coin-op market altogether. Arcade companies relying solely on interchangeable PCB coin-ops have slowly been pushed out of the picture over the last year or so and Irem are the first to announce that they will be concentrating their development solely on the console sector.

Last issue, Edge printed technical comparisons of Sega's SVP chip and Nintendo's Super FX chip, which contained some factual errors, and showed Super FX in a poor light.

To set the record straight, we spoke to Argonaut about the Super FX 2, which will be used in *Stunt Race FX* (**Edge** 6) and also *PowerSlide* (p34).

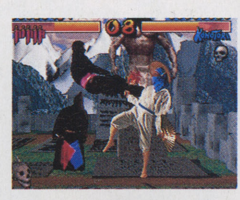
The Super FX2 operating system is rated at 21.477MHz (one instruction per cycle, so 21.477 Mips), and can generate between 5,000 and 10,000 polygons per second (a 30% increase over the first FX chip). It has also been seen to handle up to 32,000 small triangular polygons per second in complex shapes – a function which is rarely used.

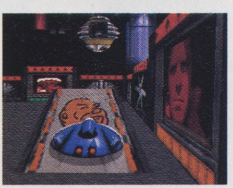
Argonaut admit that Sega's SVP probably runs at a similar speed, but state that the Super FX supports all SNES screen modes: 4, 16 and 256 colours, whereas the SVP only has 16 colours. *Virtua Racing* runs at approximately 12-15 frames per second, and while *Stunt Race FX* (originally called *XLR8*, by the way) runs at about the same speed, it's actually doing twice the processing to run in 256-colour mode.

The SFX also has no built-in masked ROM; it contains purely task memory so it runs its program from the same ROM the game does. Different games merely need different ROMs; you don't need to change the SFX chip.

If, as suspected, the SVP has masked ROM, there's one program in the game ROM and one program – between 8 and 16K big – in the SVP chip. Every new game needs a new SVP chip, and the program size is limited by the internal chip memory; SFX is only limited by the game ROM size, which in most cases is between 4 and 16Mbits. So now you know.

Code Masters – who are gaining a reputation for their ingenuity – have done it again with their new Mega Drive footie sim. It's a fourplayer game, but to avoid any EA/Sega adaptor incompatibility, they've built two ports into the cart itself. Clever.





3DO: Naughty Dog's *Way Of The Warrior* (top) and *Patatank*





Neo Geo: Data East's *Windjammers* (top) and ADK's *World Heroes Jet*

viewpoint

What's your **opinion**? **Write** and **tell** us: **Edge** letters, 30 Monmouth Street, Bath, Avon, BA1 2BW



Forgive me if I'm wrong, but **Edge** seems intent on only reviewing imaginary and/or tangible 3DO machines. I'm staring at the first double-page spread for Commodore's CD32 in issue three and yet I cannot recall any review of the system, impartial or otherwise.

Does this mean that **Edge** is on the 3DO payroll? Your editorial people have been drooling over that crock of potentiality (3DO) for so long now it's ridiculous!

Commodore has come up with a fairly inexpensive, totally viable, true 32bit CD-ROM based games platform with an open ended architecture. The Amiga CD32 is the entertainment system for everyone!

Couldn't your editorial team see its way clear to put all the facts and figures together and pump out a decent appraisal of the CD32? Some of the up and coming titles being developed for CD32 must surely come close to those on 3DO? Try playing FMV software on your 3DO system! I've seen the beta MPEG1 module with my own two eyes and it is superb!

Can a 3DO system be expanded into a powerful personal computer? I think not. Can 3DO boast the support of hundreds of dedicated programmers and artists who are already familiar with both its hardware and software? Can software developers rely on 3DO users rushing out to purchase tens of thousands of units tomorrow, or whenever they eventually see the machines in outlets?



The Amiga CD32: has it had the coverage that it deserves? And is Edge really on the 3DO payroll? (See letter from Barry Densley)

There are tens of thousands of Amiga 1200 and 4000 owners already champing at the bit for CD32 compatible drives and MPEG modules! I know where I would be investing my money for future CD-ROM titles.

If you're reading this Trip... Be afraid! Be very afraid!

Barry Densley, Australia

Edge has wanted to cover CD32 software, but so far there have been few dedicated CD32 games – merely Amiga ports with CD soundtracks and overblown intros – and we have yet to get an FMV cart from Commodore, let alone FMV software.

3DO is an important system and deserves our attention – but to date we've had one feature (in **Edge** one) a few news stories and five game reviews: hardly what you'd call 'drooling'.

However, a CD32 hardware feature is overdue; we'll take an in-depth look at the Amiga CD32 very soon.

During the 8bit period, many games had stunning soundtracks. The sampling was often awful, but the tunes themselves were excellent – often atmospheric and a real pleasure to listen to.

Recently, however, I believe the standard of ingame tunes has dropped. Titles like *Stardust*, *Zool* et al don't have anything on the tunes of the 'golden oldies'. Just some of the all-time favourites include *Monty On The Run* (C64), *Super Wonderboy* (C64), *Knight Time* (Amstrad), *Ghouls 'n' Ghosts* (C64) and the great *One Man And His Droid* (C64).

In this age of 16bit sound technology and high frequency sampling, why is it that most of the tunes aren't a patch on the 8bit classics? I believe it's because some musicians think they can hide their tunes behind loads of well-sampled beats – something that wasn't possible in the 8bit period. There are a few exceptions – *Castlevania*, *Lemmings*, *Equinox*, *Turrican 2* and *Sonic*, but most recent soundtracks are appalling.

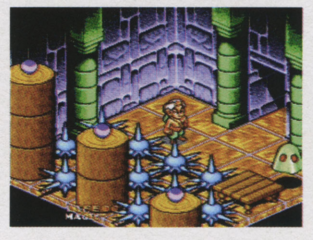
Some may believe music doesn't make a game, but to me, it's every bit as important as the graphics, if not more so.

Out of interest, which companies are Rob Hubbard, Tim Follin and Mark Cooksey working for? Because these were some of the best authors around during the 8bit period.

Nathan White, Walsall

Agreed: with a few exceptions, ingame music does seem to be something of a lost art. With the 8bit machines, musicians effectively had to code their music; they had to try so much harder to get anything decent out of the machines at all. It was all much more of a challenge – them against the limitations of the hardware.

Perhaps now, with the entire range of instruments, samplers and sequencers at their



***Equinox* – one of the few 16bit games with decent music... (See letter from Nathan White)**



Tim Follin, one of the greatest of the old 8bit musicians. (See letter from Nathan White)

disposal, the challenge has gone. Maybe there are some musicians out there who would like to comment on this?

For your information, Rob Hubbard moved to EA in San Mateo, California about five years ago – and hasn't done a decent soundtrack since. Tim Follin, who did *Equinox* on the SNES two years ago, left Software Creations recently and now works at Malibu Interactive in Warrington. Mark Cooksey continues his long-standing relationship with Elite Systems. He actually works for himself, but is based in NMS Software's offices in Pelsall in the West Midlands.

I read with interest your article on Atari's new 64bit Jaguar. You quoted marketing manager Darryl Still as saying: 'Jaguar is not just the first 64bit console, it is the first 64bit system of any sort.'

This is a major error. An international computer giant – bigger then Sega, Nintendo or Atari, and no, it isn't IBM – has had an incredibly powerful 64bit PC on the market for some time now. The giant: Digital Equipment Company (DEC); the system: The Alpha AXP.

The Jaguar is undoubtedly the machine which will make or break the legend that is Atari. Following a ludicrously low-key prelaunch advertising campaign, people now claim the latest machine is something it is not. Alpha systems are way ahead of their time, capable of up to 100 Mips, compared to Jaguar's now fading 27. I recently saw a demonstration of some of the Alpha hardware, and this workstation, comparable only to perhaps a Silicon Graphics RealityEngine, was moving an F-16 fighter in real-time. The gaming potential is superb.

Kevin Gordon, Hampshire

The DEC Alpha may run Windows NT, but it isn't strictly speaking a PC compatible machine. It also costs a nifty £5,000; the Jaguar costs just £200. So compared to Trip Hawkins' imaginative yarn-spinning, Darryl Still can be forgiven this slight exaggeration.

After reading Neil West's letter in issue five, I felt compelled to write in with my views on the genre debate. The best way to view the current wave of console games is to make a comparison with other industries. Like how genres work in the cinema industry… Do they provide new and exciting plots for films, each and every one stretching the very barriers of film-making? Or do they just throw out time and time again the same insipid ideas? The answer is obvious.

Virtual Reality is shaping up nicely, bit I think you're being over optimistic to imagine it'll be the breeding ground for new ideas. There's no denying that the newly employed perspective will throw up the odd gem, previously unfeasible in 2D, but on the whole the format will follow the same old pattern.

Frankly, it's not something I find particularly worrying. It's all part of a process, evident in every area of produce. Entertainment is something ordered by the people, for the people – the only way to significantly change things is to stop buying genres and opt for originality, but that simply isn't going to happen.

Whatever the case, games are starting to receive just some of the adulation they deserve, and that is something we should all be grateful for.

A partly toasted cheese sandwich, Kent

The advent of VR won't alter the genre of a game – a stereo 3D, first person perspective beat 'em up or adventure will retain many of the same game mechanics of their 2D forebears. But it will make it a whole new experience, and that's what the videogame – and videogamers – need.

I have just had the pleasure of playing Namco's *Ridge Racer* coin-op. The programmers must be congratulated on producing such a fine game. Just one thing about the game, as with others of the genre, that bothers me; that's the expensive 'Shake, Rattle and Roll' seat affairs that plague today's coin-op machines.

What makes games like *Virtua Racing* and *Final Lap 2* so much fun, is the multi link-up of machines, allowing for rip-roaring player battles, *Final Lap 2* is the best example: a game that looks and sounds prehistoric, but still attracts the punters with its eight player option.

The problem with *Ridge Racer* and *Virtua Racing* is that most arcades cannot afford the hefty price-tag that these machines demand. In the end it's the actual gameplay that counts, not the various bump 'n' go special effects.

Ridge Racer looks and plays brilliantly, but would be all the better if the arcades could afford to link them up for simultaneous multi-player action.

Christopher Wood, Hackney

Of course, they'll need to pay for an extension to the premises as well…

I had thought that at last there was a magazine that treated the world of videogaming in a mature and impartial manner. That was before I read the article on the Sega Saturn in **Edge** five. The substance of the article was clearly based on a collection of rumours put about to spoil the launch of the Jaguar and 3DO.

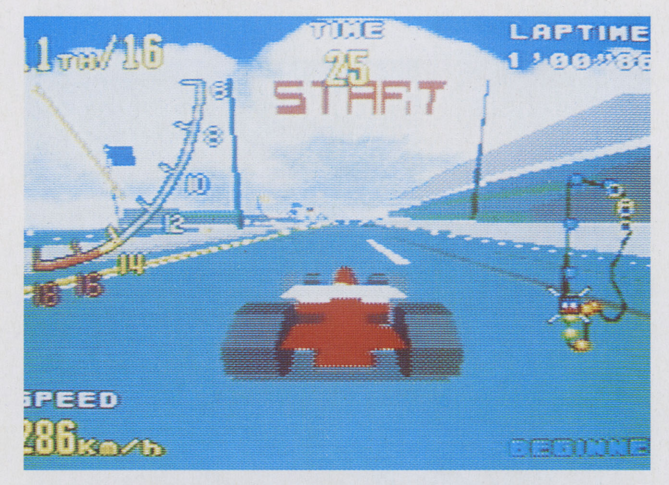
As an electronics engineer and chip designer I have severe doubts that a processing engine with the performance of *Virtua Racing* could be produced for under £200. Improvements in both cost and speed can be made by using custom chips, but this can only go so far (remember *Virtua Racing* costs £10,000, and the processing will be a significant fraction of this).

The 7Mb of RAM you quote would cost Sega about £100; a quad-speed CD-ROM currently retails at over £800 and Compaq's voice command technology adds a few hundred pounds to the price of a PC.

While you criticise many of the early releases for the Jaguar and 3DO, you assume that the first Saturn releases will be arcade perfect. This is not Sega's track record (remember *Altered Beast?*). Mega Drive software was generally poor until *Sonic*, and Mega CD games are still poor.

You also criticise Atari for dumping the Panther and replacing it with the Jaguar. However, the Saturn you report on is clearly a very different machine to the 'Saturn' Sega originally announced, which was a high performance sprite shunter (in many ways similar to

Continued next page



The *Virtua Racing* coin-op: not as impressive as Namco's stunning *Ridge Racer*, but still great fun with its multiplayer option. Just wait for *Daytona*, though… (See letter from Christopher Wood)

viewpoint

the Panther).

When you reported on Nintendo's Project Reality you were rightfully sceptical – you should have approached the still vapourous Saturn the same way.

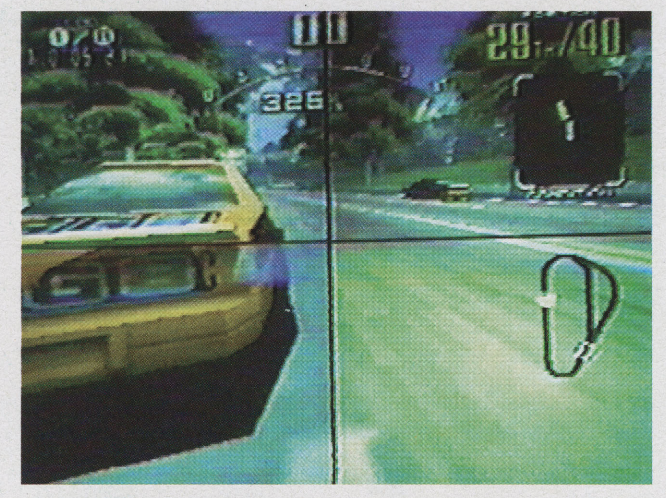
Jon Stern, Sheffield

Issue 5's Saturn story was as accurate as possible given the information available. And in the words of an official at Sega Japan: 'We have made significant progress towards higher performance at a low cost.' Also, remember, Sega don't intend to make money on consoles: it's software that will generate the profits.

As regards the quality of Saturn games, porting software from a coin-op to a powerful graphics engine is one thing; trying to squeeze a coin-op of *Altered Beast's* size into a single 68000 chip is something else.

Edge is guilty of nothing more than optimism. And our lack of scepticism was borne out by last issue's CES report: Saturn is practically complete; games are running; it looks amazing. End of story.

You say in **Edge** two that Nintendo can't be first with 64bit technology because Atari is already doing it. But there is a big difference between the Jaguar and the Nintendo console. From what I have gathered the Nintendo is based on Virtual Reality; the Jaguar is not. I believe Virtual Reality is perfectly possible on any machine – even the humble 8bit Nintendo – but the program would have to be very big.



Can the Sega Saturn console really shift the same number of polygons as the £10,000 *Virtua Racing* coin-op? No, it's far better than that, if Daytona (above) is anything to go by (See letter from Jon Stern)

Still, the 64bit Nintendo is going to be specifically for Virtual Reality. As for the Jaguar 64bit technology, it's just for platform games and the like, so you might as well buy a Super Nintendo. 64bit technology is nothing unless you put it to good use.

Leo Palamara, Australia

You are mistaking Nintendo's Project Reality with the term Virtual Reality. Project Reality is based around the technology in Silicon Graphics' RealityEngine workstation. And although Nintendo's system will be very powerful, that's not to say it will be specifically for VR uses.

Virtual Reality requires immense amounts of processing power. Bear in mind you have to generate a fully detailed 3D world in stereo, continually keep track of the player's position within that world, and also manage all the usual gaming mechanics. An 8bit NES would struggle to do even the title screen.

It can cost up to £2,000 for a 32bit PC games machine. So how is the 64bit Jaguar only £200? (See letter from Mark S Nicholson)

I own a Local Bus 486 33MHz PC and have read that there are people out there who are considering spending between £1,000 to £2,000 pounds on a PC solely for playing games on. Undoubtedly the PC is capable of running some amazing games, but it does this without refinement – it just throws its awesome power at a game to produce the results.

I will be buying a Jaguar as soon as I can get hold of one because its specifications are utterly amazing. But just think how much more incredible the Jaguar would be if the designers had been given an end price of a 486 PC. If you get a total of 55 Mips for £200 how many more would you get for £1,000?

I hope Atari and any other companies involved in producing next generation games machines realise that there are two distinct markets: the Sega and Nintendo market where people will only buy a machine for between £100 to £200, and the PC market where people would pay a lot more for a state of the art machine.

Mark S Nicholson, Old Southgate

Just because people are prepared to pay huge amounts for a machine, doesn't necessarily mean they want to. If you could buy a 486 66MHz PC for £200, you would.

Also, it's in Atari's interests to produce a cheap machine which is available to all gamers – not just those with more cash than brain cells.

As an avid spectator of the computer industry since the early 80s, I have seen the unprecedented advance in technology from the humble ZX81 to the formidable 3DO 'dream machine'.

But this dramatic quantum leap in technology has fuelled my increasing concern for the software industry. A 'better specs equals better software' syndrome has evolved in a large percentage of the major corporations' most recent hardware proposals. And the continual barrage of systems each claiming to be the 'future of home entertainment' has now reached the point where the quest for technical specifications has outstripped any investment in software and the elusive gameplay factor.

The key to keeping the software industry afloat is to balance the development of hardware with the development of software.

After all, a machine is only as good as its software base.

Anthony Lewis, Moray, Scotland

The advancement of hardware is all part of the evolution of the videogame – or, rather, interactive entertainment. There can't be that many people who are utterly content to play SNES or Mega Drive games for the rest of their life at their current level of quality and complexity. Everyone wants bigger and better – and that's what hardware manufacturers are there for.

It's not a case of 'better specs equals better software': it's the fact that more powerful systems can provide gamers with a more sophisticated gaming experience. But the development of software goes hand-in-hand with hardware: it did with the SNES and Mega Drive; it will with the Saturn, PS-X and beyond. Anyway, let's see the games first before we start criticising them…

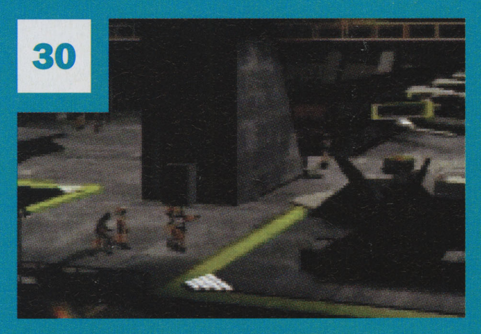
Prescreen

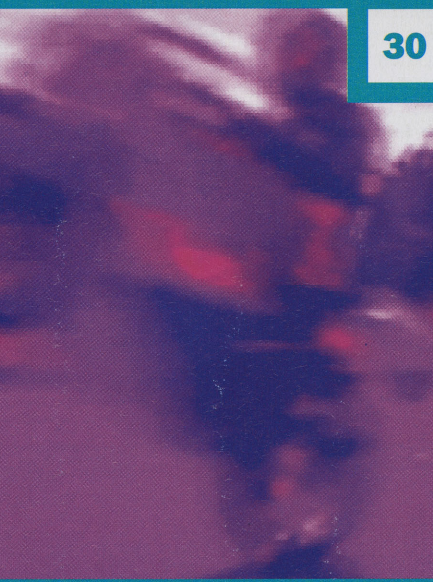
Once again racing games make up the bulk of our Prescreen section with *Daytona, PowerSlide, Dirt Racer* and *Road Rash* taking starring roles.

Daytona – and these are the first pictures to be shown in a European magazine by the way – is Sega's follow-up to *Virtua Racing*, running on their Model 2 board. And while it may not have the same wow factor as *Ridge Racer*, the multiplayer link-up option should have the punters flocking in.

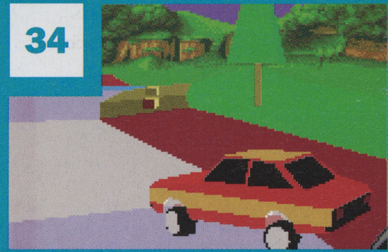
On a smaller, but no less impressive, scale is *PowerSlide*. Coming first to the SNES as a Super FX game, this is a true driving simulator in which, for a change, the car actually handles like a car. The same simulation code will then drive *Dirt Racer* over rougher terrain.

And finally we come to *Road Rash* – possibly the first decent reason to buy a 3DO system. This souped-up version of the acclaimed Mega Drive game really shows off the 3DO hardware. And it just might play well, too.

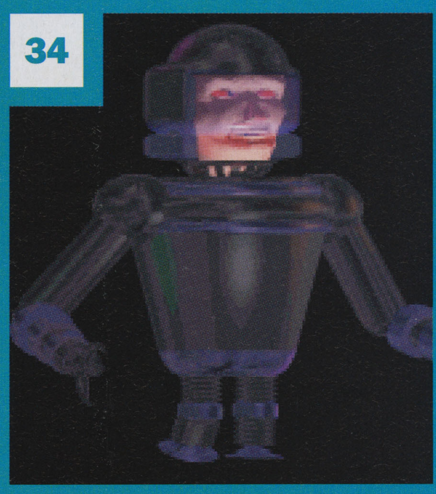
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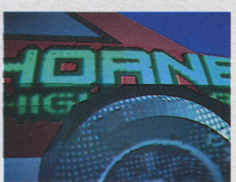
Daytona

Sega are right at the leading edge of 3D CG technology. **Edge** brings you the first proper look at what could be *the* racing game of '94







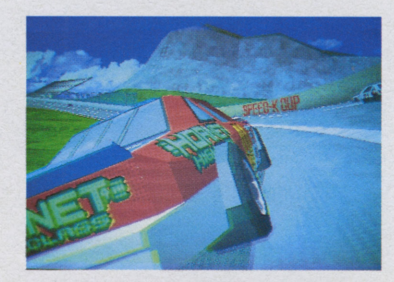


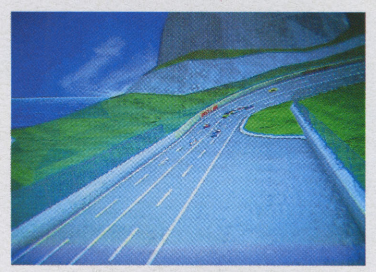
Sega's Model 2 PCB is capable of wonderful texture-mapping effects. This realtime demo painted detail on the cars and backdrops

Format:	**Coin-op**
Manufacturer:	**Sega**
Developer:	**AM2**
Release date:	**April/May**
Origin:	**Japan**

No-one can deny the impact that Sega's *Virtua Racing* has had in the arcades. Whether it's the amazing four- or eightplayer *Virtua Formula*, complete with 74inch projection screens, the scaled down *Deluxe* version, or the far more affordable basic machine, competitive racing doesn't get much better than this. However, its ongoing commercial success has meant delays for its successor. Only now is the next level being prepared for roll-out

Daytona, as the name implies, is set on the infamous oval Daytona racetrack in Florida. According to Sega, in order to accurately reproduce the dimensions of the track, information was gathered by satellite, and every last detail of the circuit was then translated into the game. You'd think that an oval track would be a doddle to recreate, but perhaps there's more to it than meets the eye. Besides, it's no secret that Sega take their coin-





The beauty of polygons is that you can zoom right in (top) or sit back and watch from a distance (above)

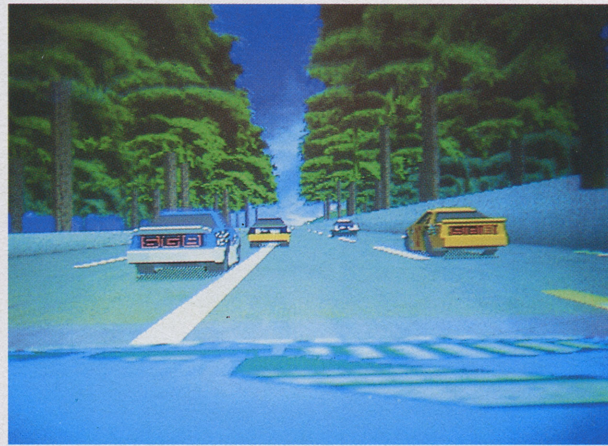


Although massively impressive, this 5%-complete demo is only a vague indication of the power of Model 2. The finished game will be vastly improved





The number of angles of perspective in *Daytona* seems to be limited only by Sega's imagination. Above is a steep, overhead viewpoint, while top right is its ultra low, ground-hugging counterpart – equally exciting





Of course, hanging out of the car window for the sake of a good view isn't recommended. How about the good old in-car shot (centre), complete with visible bonnet? Or perhaps a back-seat rear view (above)?

The game throws 300,000 texture-mapped polygons around a second – enough to knock anyone's socks off

ops seriously (they actually rented a full-scale Honda NSX racing car for the development of *Virtua Racing*).

Where *Daytona* leaves *VR* standing is obviously in the quality of the graphics. **Edge** was reliably informed by one of *Daytona*'s Japanese creators that the game, using Sega's Model 2 board, throws 300,000 texture-mapped and shaded polygons around every second. Enough to knock anyone's socks off. For comparison, the more humble Model 1 (as used in *Virtua Racing* and *Virtua Fighters*) handles about 180,000 plain polygons a second.

But what else could our Sega source reveal about the game? Well, like *Virtua Racing*, Sega are moulding *Daytona*'s appeal around the same multiplayer link-up gameplay – up to eight players will be able to compete in the expanded versions of the game. And again, there will be four selectable viewpoints, which have been tweaked to make them even more exciting. Impossible, surely? Not so, according to our Japanese friend.

Finally, making allowances for the fact that this early demo was only 5% complete, we wondered if *Daytona* would be able to surpass *Ridge Racer*, our new-found favourite. After a knowing glance at his colleague, our source beamed as if it were the question he'd been waiting for all day. '*We* think so' was the inimitably humble response. See if **Edge** agrees next month.

Credits

Director: T. Nagushi
Planner (camera): M. Osaki
Planner: Y. Arikawa
Chief Programmer: T. Masuda
Designer: Y. Kawagoshi
Designer: Y. Suzuki
Designer: H. Nakagomi
Designer: T. Kagaya
Programmer: D. Katagiri
Programmer: K. Koiwa
Programmer: H. Miyauchi
Music: T. Mitsuyoshi

Guardian

Format:	**CD32**
Publisher:	**Acid Software**
Developer:	**In-house**
Release date:	**Summer**
Size:	**1 CD**
Origin:	**UK**

At last, CD32 owners can tear away that mask of bravery they've been hiding behind these past six months. Acid Software are about to release a fast action 3D shoot 'em up called *Guardian*, and it could well do for the CD32 what *Sonic* did for the Mega Drive.

Featuring some very smooth and fast 3D polygon shooting action, *Guardian*, originally entitled *SibWing*, borrows heavily from the Nintendo classic, *StarWing*. No real surprise, as main programmer **Mark Sibly** explains: '*StarWing* is one of my favourite games. I especially love the pace of the thing. It's just perfect.' *Guardian* was originally destined to be a mission-based game. But Mark thought that it would work better as an all-out action game with a little strategy thrown in.

Watching the main craft skim over the surface of the planets is a sight to behold. It moves at approximately 17 frames per second, so the update is both smooth and very convincing – even when the screen gets busy. And unlike *StarWing*, you're given total control within the 3D environment. You can fly wherever you want, whenever you want. It's all impressive stuff – even more so when you discover that this is Mark's first attempt at a polygon-based game.

'I've always played around in BASIC with wireframe models and things,' he says, 'but I've been doing sprite-based games since I was 13. So it was quite a challenge to do something like this, and not have it slow down when the screen gets busy. It all comes down to mathematics. Now, I'm not that good at maths, but luckily I have a friend who's done this sort of thing before. He wouldn't tell me how to do it; he just told me how not to do it.'

As well as giving players the freedom to fly where they want, Mark also intends them to have the ability to see the action from any viewpoint. A zooming 'camera' feature will allow the game to be viewed from any angle and from any distance. This feature is almost certain to make it into the CD32 version, but as yet Mark's not quite sure how to implement it on the



While you're skimming over the surface of an ocean, a battleship drifts menacingly into view. Avoid it at all costs



You only have to look at this screenshot to discover that lead programmer Mark Sibly is a big fan of Nintendo's *StarWing*

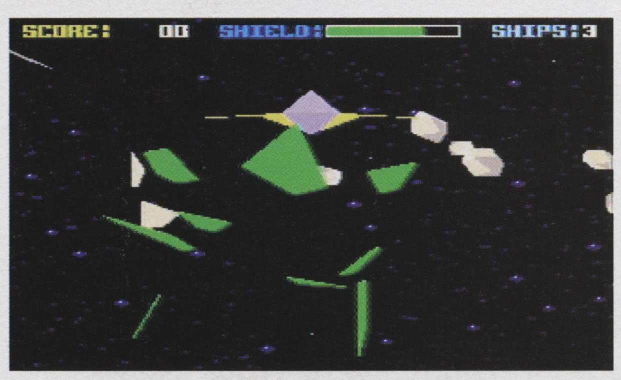
A zooming 'camera' feature will allow the game to be viewed from any angle and from any distance







The asteroid stage (above) acts as a sort of bonus level. Those asteroids may look crude, but they move smoothly. Mission screens (top right) and map screens (above right) aid your progress



With 17 frames a second on offer, *Guardian* is 3D shooting action at its very best – smooth, fast and, above all, enjoyable

A1200 without the player having to use the keyboard.

In the past, CD-based games have tended to suffer from the 'all show and no go' syndrome. Happily, *Guardian* is immune to that disease. Mark says: 'I'm more interested in doing the realtime 3D stuff. A lot of people are using CD to store lots of raytraced views. It looks nice but you're never given any real freedom of movement. *Guardian* won't be like that.'

And freedom of movement is what all shoot 'em up fans crave. Mark hopes to keep even the best players on their toes by installing a random generator. This means no level will ever be the same. Mark says: 'It's something that always bugs me – how someone can learn the pattern of a game and know exactly what's coming up next. Each time you play *Guardian* you'll get a slightly different map, with aliens appearing at random points.'

Another unconventional feature is that the game will have no ending as such. 'Why must there be an ending?' asks Mark. 'I remember a time when people played games for high scores, and to see what level they could reach, not just to get to the end of a game.'

After only six months in production, *Guardian* is already nearing completion (unusually, it will be appearing on the CD32 first, and then on the A1200). The big question remaining to be answered is: if it takes one man six months to produce a game like this, what the hell are all those big-team developers doing with their time? E





Flying towards the enemy (top). A polygon explosion (above). Alien spacecraft attacking in formation (right)







Electronic Arts

The 3DO cause is about to get a much-needed shot in the arm thanks to EA's new batch of games titles. **Edge** does the unveiling

Trip Hawkins' 3DO system has not had the most auspicious start in life. Selling a mere 10% of Trip's estimated 100,000 to date, it lacks market presence and, more importantly, decent software. But Trip and 3DO have one saving grace: their intimate links with Electronic Arts – the company founded by Mr Hawkins himself.

For the last year, coders at EA's US headquarters and in Canada have been beavering away on a dozen titles, including *John Madden Football* (Prescreen, **Edge** 6) plus a quartet of games which are now nearing completion: *Road Rash*, *Shock Wave*, *PGA Tour Golf* and a late entrant, *FIFA Soccer*.

'Like all 3DO developers, we are in the learning curve for programming on the system,' explains **Frank Gibeau**, EA's US product manager. 'We've had games in development since earlier last year, and have many still in development. Different projects take different times: on average we can be looking at 12-16 months from concept to completion.'

The title most likely to break the finishing tape first is a conversion of the popular Mega Drive cart, *Road Rash*. Anyone familiar with the original will immediately notice the improvements: EA have tried hard to give the game that distinctive 3DO look: texture-mapped road, texture-mapped buildings, and silky smooth scaling.

Frank reckons that some of the 3DO's best features are its TV-quality static graphics and powerful Cel Engine for rendering – and this is certainly borne out by *Road Rash*'s impressive visuals.

But as well as improving the ingame graphics, EA have used *CinePak* to enhance the front end: leather-clad bikers zoom around the screen as a specially recorded *Road Rash* rock tune plays away in the background. The game itself hasn't changed that much – you still ride a bike 'into' the screen trying to reach the relevant destination, but this is no bad thing as the



Electronic Art's plush headquarters in San Mateo, California. Its inhabitants have produced the best 3DO games to date











***De rigeur* for 3DO games is an FMV intro: (from top) *Road Rash*'s couriers from hell go about their chain-weilding, police-evading business; you get a chain up the visor for your troubles (pic four); the victorious biker claims his spoils (bottom)**



The 3DO scaling only becomes apparent at full zoom (main). *Road Rash* is all about winning: lose, and the opposition bolt stabilisers to your bike and proceed to take the piss (inset)

original game played so well.

Road Rash is almost finished, bar minor tweaks to the game mechanics. EA are hoping to have the game ready by the time the 3DO gets an official British release, which is sometime in April.

Apart from an impressive FMV video demo, little has been shown of Electronic Arts' 3D space epic – *Shock Wave*. Indeed, the actual game has been veiled in mystery since it first appeared on the 3DO demo CD – until now.

Shock Wave is being promoted as an 'interactive science fiction movie'. But unlike most interactive movie efforts, *Shock Wave* has the word 'professional' written all over it. And this time, the word 'interactive' means just that. Taking the role of an untrained rookie, you've been forced into joining a team of highly skilled space fighter pilots, in a bid to save planet Earth from an impending alien invasion.

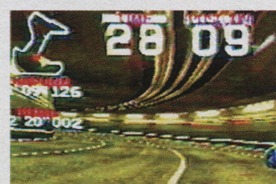
Shock Wave is a lavishly produced product, with an intro sequence that most sci-fi movies would be envious of. But, given that they're generally watched just once or twice, are they really worth all that time and effort – and money?

'They're very important for setting the scene for games,' counters Frank, 'especially for our interactive movie-type products; they provide a thrill that is never forgotten. But at EA we don't just provide that initial thrill, we use the intro as an integral part of the game. For instance, in *Shock Wave*, you are introduced to your wingmen – their characteristics and how they fly, which is important to the gameplay. Throughout the game these people will feed you information and

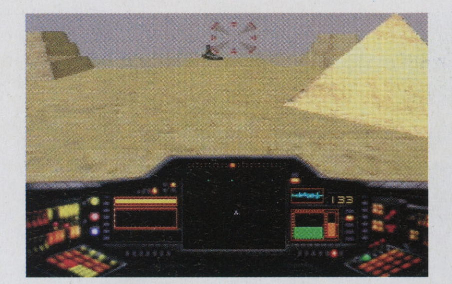
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3DO *Road Rash* is a far cry from the relatively spartan Mega Drive version. The rev counter and speedo (top right) can be removed with the press of a button for glorious fullscreen action







The only mission in *Shock Wave* so far takes place over Cairo, with its sand dunes, ziggurats, pyramids – and Ack-Ack batteries



Shock Wave's alien forces consist of attack fighters, crawlers, ground-based cannon and these insect-like walkers. The texture-mapped ground detail is all flat, so 3DO could handle a lot more

Continued

advice. We use FMV heavily throughout the game; we're confident that people will want to watch them again and again and share the experience with friends.'

A dubious claim, perhaps, but the intermission screens do add to the already tense atmosphere, while the texture-mapped 3D landscapes (which, incidentally, have been created from real-world data) are the icing on the *Shock Wave* cake. Although the single level **Edge** was shown isn't as impressive as *Total Eclipse* – *Shock Wave*'s 3D landscapes appear quite flat – they've improved no end since a jerky, unconvincing version was first shown at last year's summer CES.

EA have made a genuine attempt at adding captivating gameplay to those impressive FMV scenes. Let's hope the end result was worth the extra effort.

Thanks to

the talents of the EA Sports development team, 3DO-owning armchair sports fans have plenty to look forward to, with *PGA Tour Golf* and *FIFA Soccer 3DO* joining *John Madden Football* on the sidelines.

PGA Tour Golf is also teeing up for an April release, and is yet another Mega Drive conversion. The early version of *PGA Tour Golf* **Edge** saw contained impressive visuals of the player and course – made of beautifully texture-mapped polygons – but was lacking in the 'extras' that made *PGA* such a hit on the Mega Drive.

Hole fly-bys weren't featured in the pre-pro version – although there's no reason to doubt that they will be – either pre-rendered or generated on the fly.

But, sadly, any 'ballcam' mode was absent: once the ball is struck, you're left staring into the distance until it finally lands, hundreds of yards away. And given the impending release date, it's unlikely that this feature will be incorporated before completion. Still, *PGA Tour Golf* has always played a great round of golf, and it's unlikely this version will do otherwise.

Unlike *PGA*

and *Madden*, *FIFA Soccer* on the 3DO wasn't a carefully calculated business decision, as such.

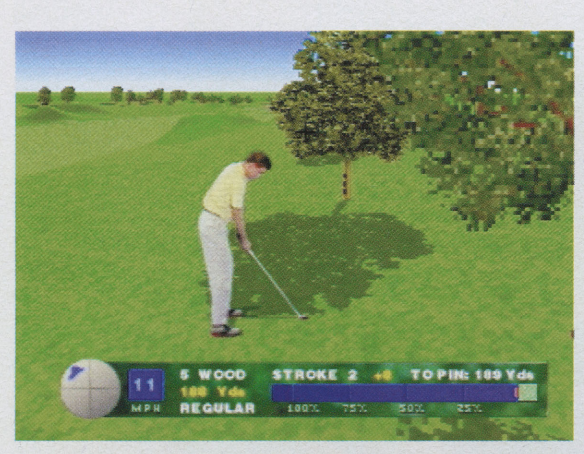
Okay, so it was inevitable that *FIFA Soccer* would join the other EA Sports titles making the leap from Mega Drive to 3DO, but no-one expected to see it so soon – including EA's bosses.

Working in secrecy, the original Canadian programming team behind the classic Mega Drive kick-about spent two months producing a mock 3DO version – just to see what they could do with the 3DO hardware.

After seeing a running demo, EA had absolutely no hesitation in giving their developers the go-ahead to finish the

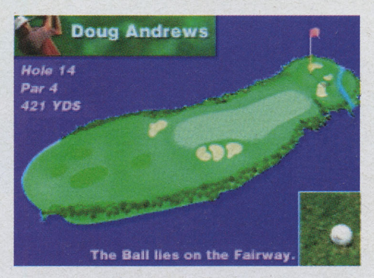


As intros go, *Shock Wave*'s is one of the finest. Using exquisite 3D rendered spaceships, photos of Earth, and 'real' actors (Psygnosis take note) the story of alien invasion is gripping stuff



***PGA Tour Golf*: 3DO's scaling makes short work of trees, while its texture-mapping generates smoothly undulating courses**







For a better view of bad lies, you can examine the course using a simple map screen (bottom left) plus lovely rendered views of the fairway and green (right)

project. And quite frankly, it's easy to see why. Because *FIFA Soccer 3DO* is without doubt one of the most realistic interpretations of football ever produced.

Watching a demo of the game is almost like watching a televised match, it really is that good. All the artificial intelligence and character sprites from the Mega Drive original have been ported directly over onto the 3DO. But fear not, digitised players will appear in the final version; it's just that the programmers saved time by borrowing the Mega Drive's sprites to get the thing up and running.

The pitch, however, is totally unique. You can scale, rotate and zoom into it by using a clever 'camera' view. The version **Edge** saw gave the player total control of this camera, and with it, the match could be viewed from absolutely anywhere – even from above the stadium looking down. How the programmers will incorporate this feature into the final game remains to be seen, but the possibilities are practically endless.

As well as the stunning camera angles, *FIFA Soccer 3DO* also boasts some amazing shadow effects. As the players run around the pitch, their shadows follow and animate with disturbing realism – giving the game a realistic 3D appearance.

FIFA Soccer 3DO is looking very smart indeed, even at this early stage. And if the first two months' work is anything to go by, when *FIFA Soccer* is finished, the 3DO could well find itself playing host to the best soccer game around.

With regard to the hardware itself, Frank remains enthusiastic. 'With 3DO, the rendering and multi-tasking capabilities give us boundless opportunities to weave our craft,' he says.

'3DO have put a lot of effort into producing an OS [operating system] for their machine. This leaves the programmer free to concentrate on the mechanics of the game and not get bogged down by a multitude of low-level routines. The dilemma for the programmer is whether to put his faith in those low-level routines or to write his own.

'There's always a trade-off between available RAM and that taken up by the OS It would have been nice to have had more available RAM implemented as linkable libraries. But so far we've been very happy with our use of the memory management capabilities of the machine.'

Certainly the quality of EA's titles gives some credence to Trip Hawkins' earlier claims about 3DO's performance. But which one really shows off the machine to the fullest?

'It would certainly have to be a toss-up between *John Madden* for its sure reality and *Shock Wave* for the outstanding rendered terrains and ships,' says Frank. 'Both contain awesome CD sound and give a playing experience unseen on any home gaming machine. The production team involved professional movie actors, script writers, directors and musicians – the full nine yards.'

Check out future issues of **Edge** to see if nine yards is enough.



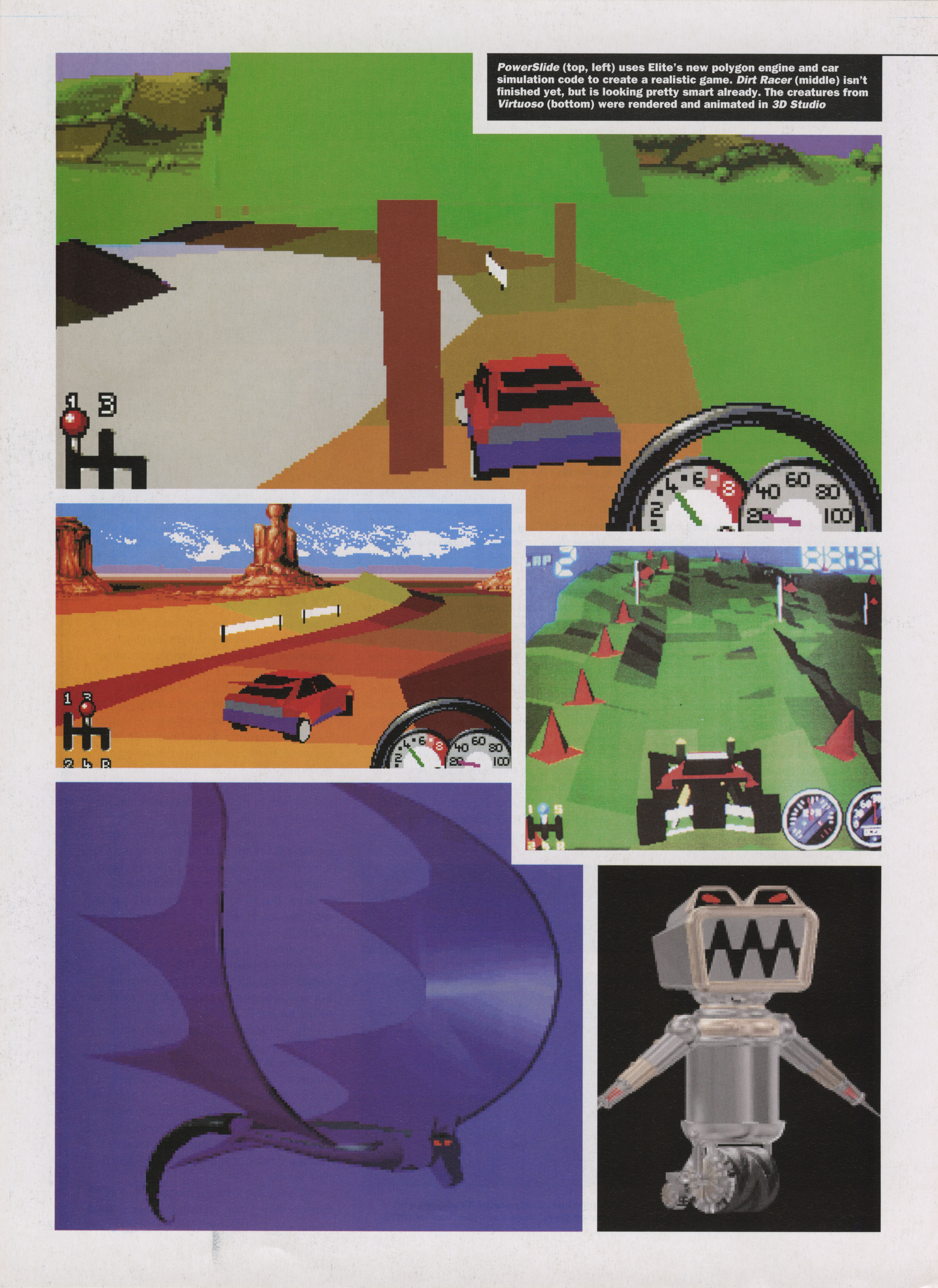




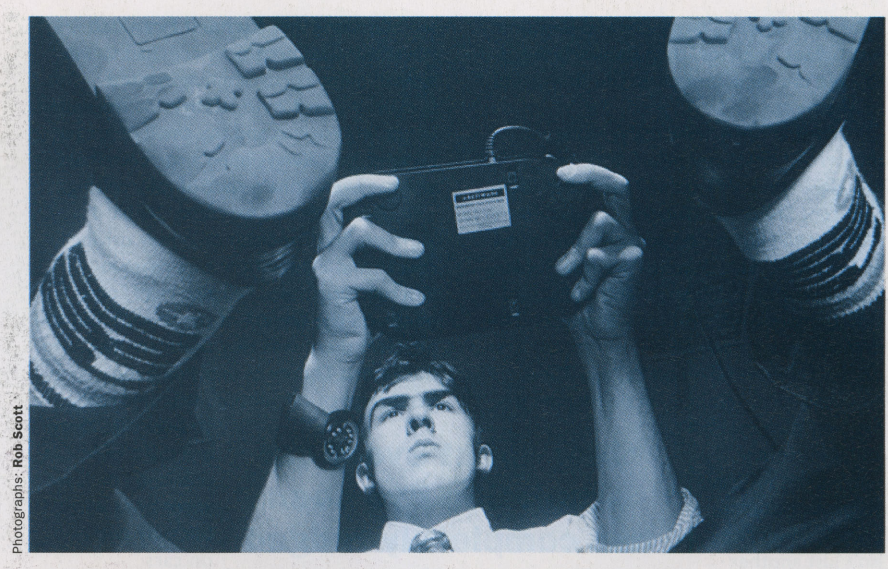




***FIFA Soccer* boasts unlimited camera angles (left), plus beautifully scaled 3D players with proper shadows (top right). It's about as close to 'being there' as you can get (bottom right)**



PowerSlide (top, left) uses Elite's new polygon engine and car simulation code to create a realistic game. *Dirt Racer* (middle) isn't finished yet, but is looking pretty smart already. The creatures from *Virtuoso* (bottom) were rendered and animated in *3D Studio*



Photographs: Rob Scott

Elite's playtesters like nothing more than playing videogames. And when they've finished playing games at work, they go home and play some more. The things people do for money...

Elite Systems

Elite made their name coding games for 8bit systems. Are they ready to face the future?

There are very few software companies around today that can boast an existence spanning over a decade. Back in 1984, at a time when the term 'software' was scarcely heard, Elite Systems was born. But it would be a mistake to think, because of their early involvement with the industry, that this Walsall-based company has had a smooth ride. Indeed, ever since its inception Elite Systems has had a somewhat erratic time, enjoying considerable success on the Commodore 64 and Spectrum 48 with

Continued next page

titles like *Paperboy*, *Buggy Boy* and *Ghosts And Goblins* one year, then singularly failing to have the same impact on the Amiga and ST the next.

But the term 'here today, gone tomorrow' obviously means little to founders Steve Wilcox and his father Brian, as recent SNES hits *Dragon's Lair*, *Joe And Mac* and the highly acclaimed football game *Striker* prove. Elite Systems are now looking to invade both the homes (and wallets) of videogamers with three new products. The first of these – *PowerSlide* – will appear first on the SNES and then on PC and 3DO.

PowerSlide has been in development for over nine months and is currently nearing the halfway stage. As stated in Edge 5, *PowerSlide* isn't just another racing simulator. The development team behind it – Motivetime – have concentrated hard on getting the cars in the game to 'behave' the way they would in real-life situations. So you're not going to be able to hurtle around a 90-degree bend at 100mph and come through it without so much as a scratch. Instead, in typical rally racing style, you'll have to learn how to 'slide' the back end of the car around corners while taking the correct racing line.

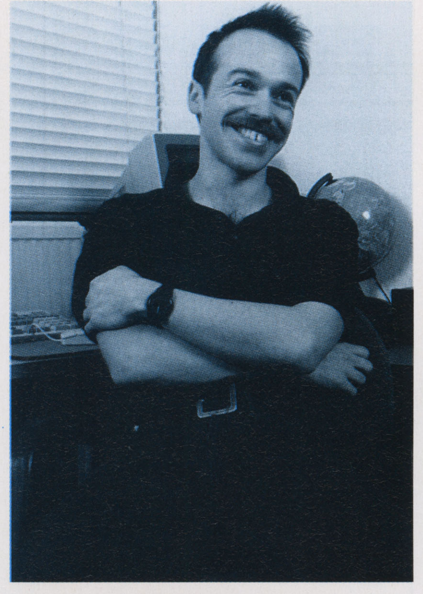
To recreate this kind of authenticity, a lot of research is most definitely needed. How do cars really work? What makes the car slide? How does the suspension react when the car slides? These are just a few of the questions that **Richard Frankish** – *PowerSlide* lead programmer – had to ask himself before programming started. Luckily, Richard is no stranger to the sound of roaring engines and the smell of greasy garages: he's always been a car enthusiast and has even done a spot of rally driving.

'Research was essential,' Richard explains, 'but I've been on a rally driving course and I know how cars react in different situations. I've also read some books on the subject of car physics. But the problem there was that there are only two books that I know of explaining the mechanics of car motion. It seems really strange that there are loads of books published on how aeroplanes work, but only two on cars.'

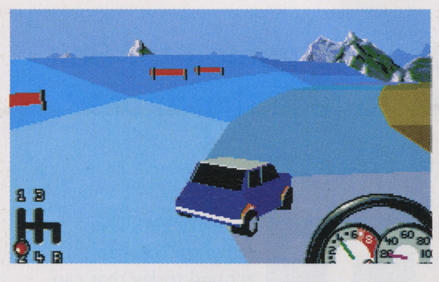
'Just about every car simulation I've seen has completely fudged the way the cars actually move'
Richard Frankish, *PowerSlide* lead programmer

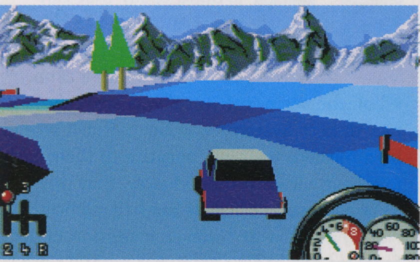
Richard's initial enthusiasm was further fuelled after seeing all the other racing simulations currently available. 'Just about every car simulation I've seen, perhaps with the exception of *Formula 1*, hasn't simulated driving a car. Apart from realistic engine noise, most games have completely fudged the way the cars actually move. In *PowerSlide* we're using real simulation technology to make the cars drive well and feel right. But for all this, the game won't be boring; it's going to be action packed and realistic.'

To ensure that the simulation aspect of *PowerSlide* is realistic, a freelance simulation expert was brought in. Having worked with many of the car industry's biggest manufacturers, he was better qualified than most to help get the simulation working just right. It took around two weeks to perform this task, which is surprising considering the amount of detail it covers. Everything has been thought of, from how the tyres act on different surfaces to the way the suspension reacts with certain bumps – the track can even detect what surface each wheel is sitting on, so if your righthand rear

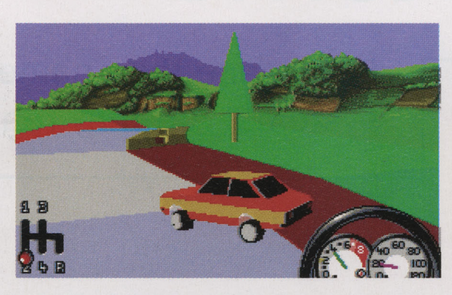


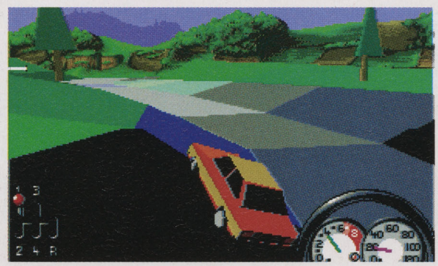
Richard Frankish, *PowerSlide*'s main programmer and car fanatic, looking rather happy with his efforts so far



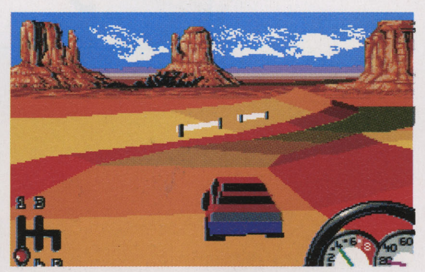


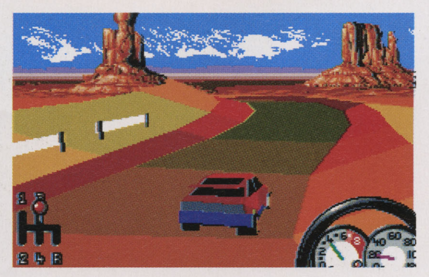
There's nothing like realtime 3D solid polygon graphics. And *PowerSlide* is full of them. The cars are each made up of over 200 polygons





***PowerSlide*'s 3D environment is totally accessible. You can drive wherever you like, as the driver of this MkII Escort has found out**





To make this Cosworth sound as real as it looks, Elite are sampling the engine sound from a Group A race-prepared Cosworth

wheel is on ice, the car will begin to slide to the right. Most designers wouldn't even consider this level of detail.

The main graphics engine and simulation code for *PowerSlide* were first produced on the PC. **Trevor Williams** – Elite's Development Manager – elaborates: 'We produced the engine and simulation on the PC first because it was easy to write it in 'C'. We can then optimise the intelligence and collisions so that the game plays really well. After all that is done, we then convert everything over onto the Super FX, straight into code.'

PowerSlide will eventually use the new Super FX chip, running at approximately 21MHz, which will no doubt increase the speed of the whole thing. **Edge** has seen an early version using the old SFX Chip and, although a little sluggish, it wasn't any slower than *Stunt Race FX* – and that's already using the faster chip.

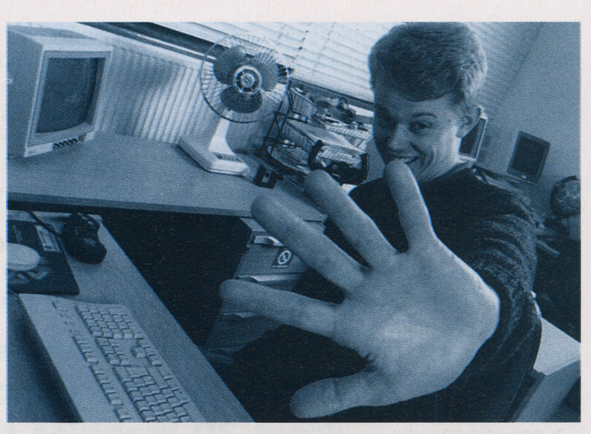
According to Trevor, a twoplayer option is essential with this type of game, which is why *PowerSlide* has one. Adopting the usual horizontal splitscreen format, *PowerSlide* allows you to race, simultaneously, against a friend. But because of the smaller playing area, the 'camera' is a touch higher and at more of an angle to show off more of the road ahead. The cars are also shrunk slightly to accommodate both players onscreen.

3DO and PC owners have texture-mapped landscapes and greater detail to look forward to. Speed will also be up on the SNES version – currently at 15 frames per second. Hopefully there'll be a few texture maps applied to the SNES version too, but if it means that the speed of the game drops because of them, they won't be included.

In an attempt to add even more realism to *PowerSlide*, Elite have approached two of the car industry's biggest manufacturers, in the hope that one of them will sponsor the *PowerSlide* project. If all goes well, Elite will include that manufacturer's cars in the finished game.

'It would be very simple for us to include any real-life car into *PowerSlide*,' says Trevor. 'All we'd need is the relevant dimensions of the car, how much it weighs, etc – our simulation then takes care of everything else. The onscreen *PowerSlide* car would then take on all the characteristics of its real-life counterpart: it would handle the same and it would accelerate in the same way.'

PowerSlide, with or without sponsor, will be burning rubber later this year.



According to Andy Williams, the head of the *Virtuoso* programming team, the game was originally going to be a platform game but soon mutated into a 3D wander-around.



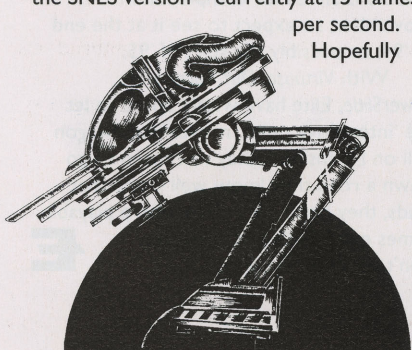
Dirt Racer

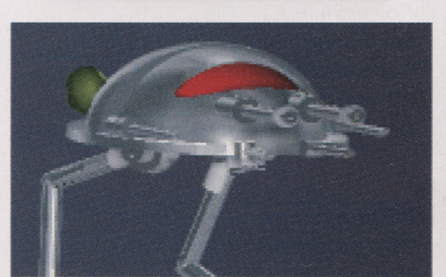
Dirt Racer is the second SFX offering from Elite. Instead of asking you to tackle the demanding rally courses that *PowerSlide* offers, *Dirt Racer* has you leaping and bouncing over rough terrain in an almost indestructible car. Graphically, it looks very similar to *PowerSlide*, but the courses have a far more rugged and chiselled look to them.

'The cars in *Dirt Racer* behave a little differently to the ones in *PowerSlide*,' says Trevor. 'They have mad acceleration, and bounce a hell of a lot more.' He also points out that the landscapes are being produced in a different way to those in *PowerSlide*: 'The landscape is being generated on a big square mesh. This way we can raise and lower certain points and create any type of race course we want. In fact, we can use the same mesh for up to five courses – all we have to do is change certain areas, create jumps, etc.'

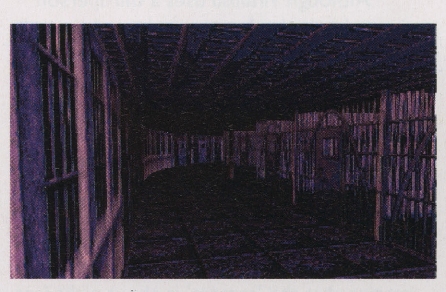
Like *PowerSlide*, *Dirt Racer* offers a simultaneous twoplayer option, and already looks very encouraging. Don't hold your

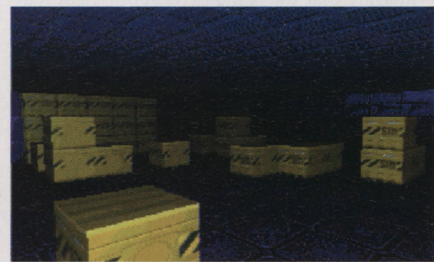
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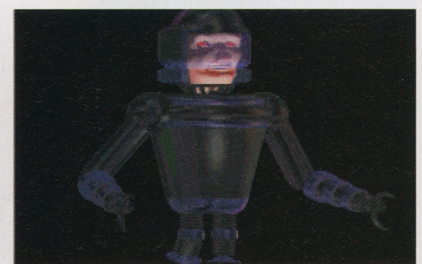


In any game, the design of the characters is crucial. This Robot Guard looks suspiciously like ED 209 of *Robocop* fame





A level is designed and then 'walked' through in *3D Studio*. If the team are happy with it, they convert it into data the 3DO understands





Elite are hoping to entice a major rock star to play the main character in *Virtuoso*. This, however, is one of Elite's programmers

breath waiting for this one, though, because it's scheduled for a '95 release.

Elite's second 3DO offering – *Virtuoso* – is unusual in many respects. Firstly, there are no cars involved, and secondly, it has a most bizarre scenario. Your character, a pop star, lives in a nightmare world where he can't go out anywhere without being mobbed. His friend sees his predicament and develops a virtual reality machine for the pop star to escape into.

Virtuoso is a 3D action game, but with platform overtones, as Trevor attests: 'It's all based in a sort of 3D world where you have to wander around and complete set missions. In a lot of 3D games you don't get the feeling of really being there, and although visually they look great, the gameplay is lost. *Virtuoso* isn't like that; it's viewed from a thirdperson perspective in 3D, but containing 2D platform gameplay.'

Andy Williams, who heads the *Virtuoso* design team, is confident that the product will be highly regarded for a number of reasons. Elite are banking on getting a real pop star to be digitised and used as the main character in the game, and although Andy wouldn't disclose exactly who they have in mind, he did hint that the person is male and that he's very big in the rock music industry.

'Designers seem so aware about producing great 3D graphics that they tend to forget about playability'

Andy Williams, *Virtuoso* design team leader

'Development is now four months old, so the game is well under way,' claims Andy. 'Originally we were going to do a platform game, but it's now turned into a 3D wander-around with platforms.

'We looked at a lot of the really good platformers, but things like *Mario* and *Sonic*, although good fun to play, are visually very simple. Then at the other extreme you have things that look fabulous, but the designers seem so aware about producing great 3D graphics that they tend to forget about playability.'

Andy is a first-timer to the architecture of the 3DO. After spending a few weeks getting used to the system, he thinks that it's a good, if slightly quirky, machine to use. But he warns programmers and designers against complacency: 'The 3DO machine is fast, but it's not that fast. You simply cannot afford to think that you've got so much power you can do anything you want with it. You have to think carefully about what you want to do.'

Thanks to the 3DO's automatic anti-aliasing feature, digitising the pop star to incorporate him into the game poses no problem. 'It's a technique they used on *Twisted*,' Andy explains. 'It's a simple and effective way of digitising characters, and one that the 3DO is very good at.'

Although *Virtuoso* uses a thirdperson viewpoint, it also has some clever 'camera' angles, with different viewpoints presented as you move through the game. But, unlike *Alone In The Dark 2* on the PC, the cameras aren't fixed.

Andy says, 'It's something we really wanted to do, but it proved to be a big problem. Because we're using a thirdperson perspective, you always see the character in front of you. If you can imagine that the 'camera' is about eight feet behind the player, when he walks up to a wall the camera follows him. So when the character turned around, the camera then panned around to show the back of the character, but in doing so was left facing the wall the character had his back to.

'To avoid this we've had to create a clever 'interactive' camera. We've done it in such a way that the camera moves around intelligently. So this time, when the character walks up to a wall and turns to face you, the camera swings to a side view of the character hugging the wall. You can then edge along the wall, *Flashback*-style. As the character approaches a corner and looks around it, so the camera moves from behind the character and pans around the corner to show what he's looking at.'

Clever stuff. However, whether Elite are able to marry their impressive visuals with decent gameplay remains to be seen. *Virtuoso* is slated for completion in November, so expect to see it at the end of '94, or possibly the start of '95.

With *Virtuoso, Dirt Racer* and *PowerSlide*, Elite have wisely opted to let the 'interactive point 'n' click' bandwagon roll on by. Instead, they've chosen to go down a road they know well – one that leads, they hope, to a place where playable games exist. Let's just hope they don't crash on the way…



The development room in all its glory. This is where the 3D graphic artists spend most of their working hours

Development manager Andy Williams is spearheading most of Elite's projects: this is going to be a busy year for him

Credits

PowerSlide

Lead programmer: Rich Frankish
Second programmer: Chris Nash
3D Artist: Dave Percival
Development Manager: Trevor Williams

Virtuoso

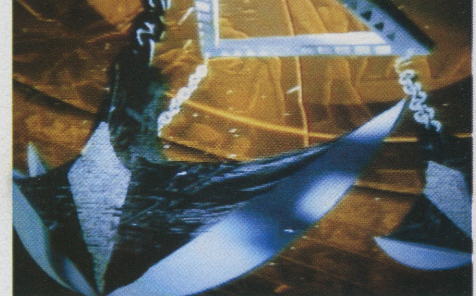
PC programmer: Matt Draper
3DO programmer: Andy Williams
Background artist: Andy Taylor
Animator: Russ Phillips
Development Manager: Trevor Williams

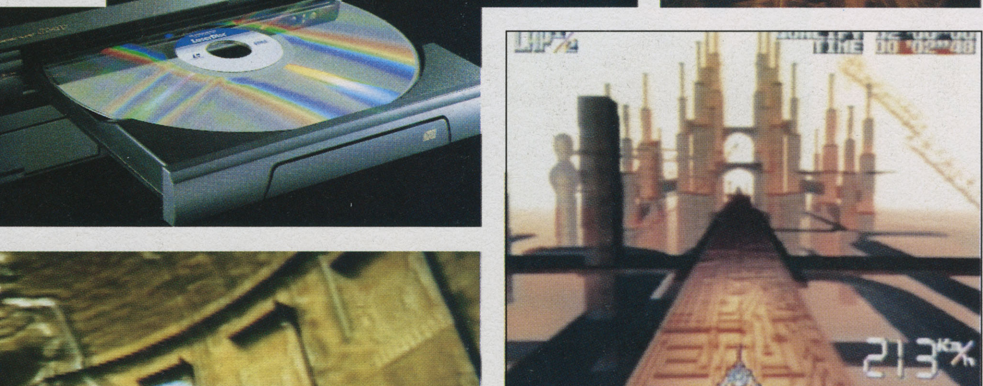

BRAVO
TIMEWARP
TELEVISION



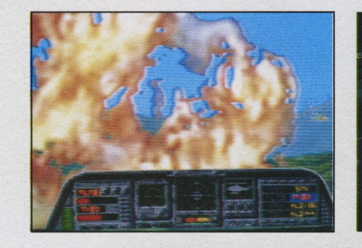


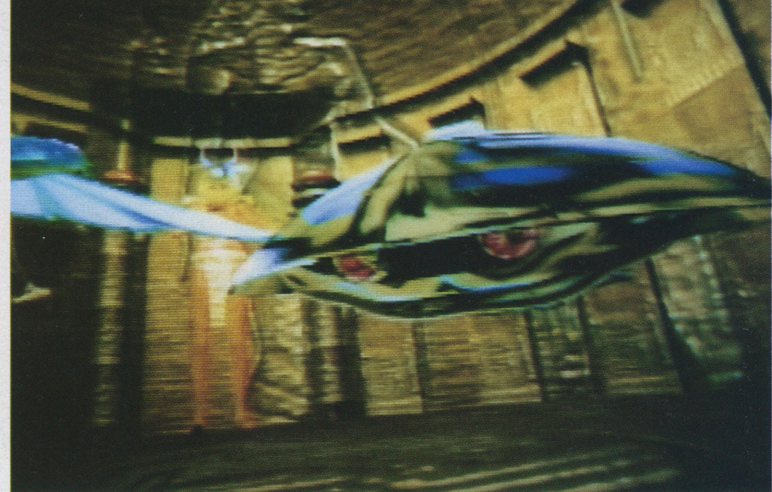






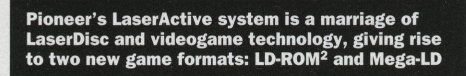












Pioneer's LaserActive system is a marriage of LaserDisc and videogame technology, giving rise to two new game formats: LD-ROM^2 and Mega-LD

EDGE magazine April 1994

InterActive LaserDisc

Pioneer are hoping to wrap up the home entertainment market with a machine that plays CDs, LaserDiscs, Mega Drive and PC Engine games. Edge goes for a spin

The aptly named Pioneer have long been at the spearhead of laser optical technology, having almost single-handedly positioned LaserDisc as a world standard for home video.

The first consumer LaserDisc player was launched around ten years ago in Japan and has slowly but steadily garnered a following among movie and home cinema enthusiasts. Its superior picture quality (60% higher resolution over standard VHS) and digital sound makes it the ideal centre of any home cinema set-up.

With over five million units in Japan, and LaserDisc players installed in around 1% of American homes, the LaserDisc industry is big business – especially for Pioneer. Now, with their LaserActive system, they're turning their attention on the interactive multimedia market.

The LaserActive machine is akin to an FMV-capable CD-i unit; but rather than design and use their own dedicated multimedia technology, Pioneer have struck a deal with Sega and NEC in which plug-in modules give the LaserActive compatibility with

Continued next page

LaserActive

LaserDisc formats

Standard LaserDiscs come in two formats: CLV (Constant Linear Velocity) and CAV (Constant Angular Velocity). The latter already possesses some degree of interactivity in that CAV discs allow you to view every single frame on the disc – all 54,000 of them.

Newer films – the most notable being extended versions of The Abyss and Terminator 2 – have CAV sides which allow you to step through special effects sequences and to read pages of text.

Not only that, but because the disc contains both digital and analogue stereo audio tracks, you can watch a movie clip with different narrative voice-overs on either analogue channel.



Mega Drive and Mega CD titles, and all PC Engine (Turbo Duo in the US) cards and CDs. Obviously, the scarcity of PC Engine/Turbo Duo titles in the UK means that the PAL LaserActive buyers will only have the Mega Drive module as an option – although there will be Pioneer's karaoke module, which opens up LaserActive to Pioneer's library of some 200 karaoke discs.

The pairing of LaserActive with Sega and NEC modules also gives rise to two new formats: Mega-LD and LD-ROM^2 games. And it is here that LaserActive hopes to compete with the likes of CD-i, PC CD-ROM and even 3DO.

There is a problem, though, in that it's not a true melding of LaserActive and Mega Drive technology: Sega's hardware provides the 'interactive' graphics – effectively the sprites which the player controls – while the LaserActive supplies the background visuals. The first batch of titles is immediately comparable with CD-ROM games like *Rebel Assault*, *Microcosm* or *Silpheed*, where your craft is 'on the rails': you can move anywhere on screen, but have no control over the direction of your path.

There's also a major drawback in the disparity between the sumptuous LaserActive visuals and the Mega Drive's rather basic graphics. *Pyramid Patrol* is a typical example: the 3D pyramid interiors fly around in glorious, Silicon Graphic resolution, while coarse, blocky aliens and explosions are overlaid on top. It's like having Lamborghini bodywork with a Morris Minor engine.

'History tells us that it tends to be dollars for pounds – how many machines would we sell in the UK at £1,200?'

John Barnford, PR manager, Pioneer UK

However, the potential of the system is still enormous: the modular design of the system would conceivably allow any games machine to be emulated, such as 3DO or even Jaguar, providing higher resolution graphics for LD games and also giving access to higher gaming performance than the lacklustre Mega CD. And it would also be a simple matter of producing an MPEG1 cart enabling LaserActive to then play Digital Video movies.

LaserActive is still ideal for educational titles, interactive movies and games like *Mad Dog McCree* and *Dragon's Lair* (both originally coin-op LaserDisc games) which don't rely heavily on support from on-screen graphics. With a point 'n' click interface, all you really need are small icon sprites and a cursor, which even the Mega Drive can handle.

LaserDiscs themselves are an excellent – if slightly bulky – storage medium. A 12cm CD-ROM contains 540Mb of useable digital storage, whereas a 30cm LD-ROM not only contains the same amount of digital storage, but also has room for 30 minutes of analogue CAV (60 mins CLV) film footage with four hours of ADPCM audio. They're also double sided, so one LD-ROM could store two hours of MPEG video plus two hours of CLV video.

So the success of LaserActive really depends on the imagination and skill of the programmers, although the first attempts at LD software – there are over 20 titles now available – have had a lukewarm, if not downright hostile, reception in Japan and the US.

As well as shoot 'em ups – which most of the first Mega-LD games seem to be – LaserActive also has aspirations towards education, multimedia and, ahem, adult entertainment.



The CLD A-100 LaserActive is Pioneer's first multimedia/gaming system. And, if nothing else, it's a damn good LaserDisc player

Pyramid Patrol (Mega-LD)

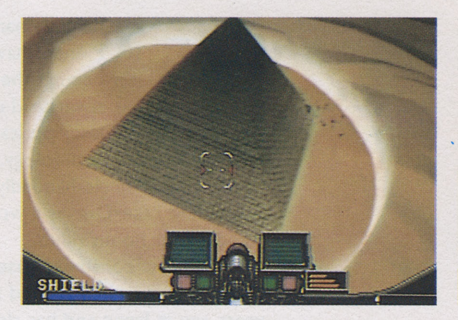
The very first title for LaserActive's Mega-LD format is Taito's *Pyramid Patrol* – an unashamed shoot 'em up in which you pilot a fighter craft through the labyrinthine depths of a colossal enemy-held pyramid.

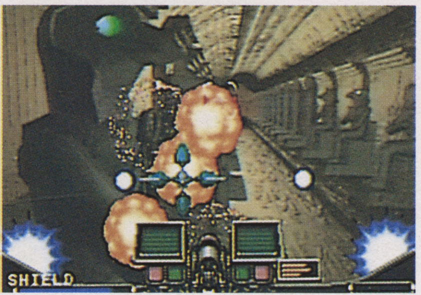
Like many CD titles, it utilises full-motion video backgrounds, with gunsight, enemy ships and explosion sprites overlaid on top.

Without doubt the scenery is spectacular, with gorgeous rendered pyramid interiors, filled with towering statues, swinging blades, spinning guardians, laser beams and so on. Sadly, the same cannot be said for the Mega Drive graphics, which – even by Mega Drive standards – are pretty crude.

But, more to the point, interaction with the background is minimal, which merely emphasises the incongruous visuals.

The blasting action on offer is quite frenzied, playing like *Microcosm*, but overall, *Pyramid Patrol* is hindered by poor game structure with overlong levels, immensely hard bosses and no passwords or restarts.





Taito's first Mega-LD game is an out and out shooter, played against an alien/Egyptian backdrop. Upon entering the vast Pyramid (left) you're guided through immense rooms and corridors (right)

I Will – The Story Of London is an interactive movie mystery, in which you collect clues and engage in a scenic tour of London at the same time. Sadly, its only outstanding feature is the dreadful acting by the British cast!

The potential for education is explored by *The Great Pyramid*, which describes the last resting place of the Pharaoh Cheops, using maps, diagrams and pictures of the hieroglyphs contained within.

LD-ROM^2 titles include such notables as *Quiz Econosaurus*, a kids' quiz game in which you can save the planet by answering questions correctly.

A game with lower ideals is *Virtual Cameraman*, which enables you to capture young oriental girls in various poses. It's up to you to choose your model, select the location, frame the shot and take a – suitably suggestive – snap at the right moment.

And, knowing the Japanese interest in young, scantily-clad girls, LaserActive's hi-resolution pictures will be put to equally dubious use in other titles.

LaserActive was launched in Japan last August, and made it into US stores around November time. With a European launch on the cards, **Edge** spoke to **John Banford**, PR and product development manager and **Jason Doran**, marketing coordination manager at Pioneer's UK headquarters...



John Barnford (left) and Jason Doran (right): PR and marketing manager respectively, at Pioneer UK. Those sheets hide top-secret hi-fi systems

Edge: Do you think we'll see a PAL standard LaserActive before the end of '94?

John Barnford: Yes, possibly: Pioneer have made this machine for the home market and the American market, so there's an awful lot of work to do before they can make a machine available for Europe. Forgetting games, just on the LaserDisc side, we want a dual standard machine. While we'd rather watch PAL discs because the quality is better, we still want NTSC capability as well to watch American discs.

Pioneer have got quite a lot of engineering work to do before we can have a dual-standard machine that will also play PAL Laser Mega CDs. As with LaserDisc historically, LaserActive will only be successful on the back of software provided with it.

Edge: LaserActive was quite expensive in Japan and America – how much will it cost over here?

JB: No idea, really: we know that in America, with a Sega pack, it's $1,200 or something. Now, history tells us that it tends to be dollars for pounds – how many of those machines would we sell in the UK at £1,200? Not a lot.

So if we're honest with you, we're not unhappy that we haven't got this machine in the UK at the moment. The longer we have to wait the more software there'll be, and we'd much rather say, 'Hey, we've got a new machine with 50 exciting titles to go with it', which is much better than what the Americans have had to do this

Interactivity – at a price...

A continual drawback with LaserDisc is the high price.

Even though LaserDisc is a popular format in Japan and the States, market penetration is still poor compared to VHS. The cost of discs and players is therefore inflated – and especially so in the UK, where good machines start at around £500 and decent movies are £40 a shot.

Even in japan, LaserActive is a costly piece of kit:
CLD-A100 player: ¥89,800 (£560)
Mega-LD module: ¥39,000 (£240)
LD-ROM^2 module: ¥39,000 (£240)
Karaoke module: ¥20,000 (£120)
Mega-LD games: ¥2,500 (£15).

Of course, UK prices have yet to be fixed, but don't expect them to be any lower.

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Rocket Coaster (LD-ROM^2)

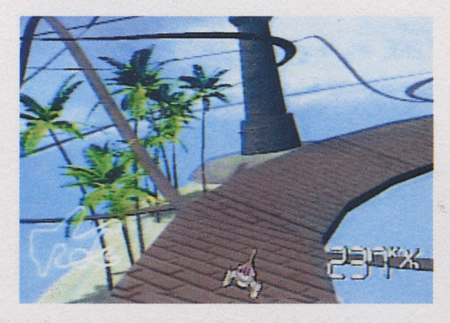
Taito's first LD-ROM^2 game is set in the 21st century, where huge amusement parks feature the latest in thrill rides.

Rocket Coaster is simply a test of personal skill, rather than a race, as there are no other vehicles on the course.

You can choose from three circuits, each with a different theme: the easy Fantasy course is full of middle age castles; the intermediate course, Adventure, is littered with palm trees and pirate ships; and the last, most difficult, circuit is called Future. Unsurprisingly, this is a scenic tour through a futuristic city.

The aim is to stay on the circuit, while negotiating the twisting curves of the track. There are obstacles to avoid, like closing gates or fire-spitting dragons, and there are marks on the track which you can hit for extra speed.

Like *MegaRace* on the PC, the success of the game depends on how well the car interacts with the scenery – clipping the edges of the course properly and being able to hit obstacles. But even then, its appeal looks slightly limited.





The winding rollercoaster tracks of *Rocket Coaster* are well depicted in this shot of the Fantasy course (left). If nothing else the graphics are impressive, as shown by the Future circuit (right)

LaserActive

Home entertainment



Pioneer's MIDI system with built-in LaserDisc player

At Pioneer's UK headquarters, Edge was lucky enough to steal a glimpse of Pioneer's brand new MIDI home entertainment system.

As well as a turntable, cassette and radio tuner, it boasts an amp with Dolby Pro-Logic decoding plus combined CD/LaserDisc player.

For £1,000, this represents another step towards the single do-it-all unit. All it lacks now is the multimedia capability of LaserActive.



year, which is say, 'Hey, here's an exciting new machine and... er... we've got three disks.'

Edge: But you don't necessarily need to buy the modules...

JB: That's right. If you have the Pioneer LaserActive CLD A-100 with no plug-in modules – without the plug-in modules it's about $800 [£485] – it is just a LaserDisc player. It's a little bit more expensive – I'm sure you can get a similarly specified player in the States for more like $500 [£300] – so you're paying a bit extra because its upgradeable.

Edge: Are you becoming more concerned with the games side yet?

Jason Doran: A lot of research for our market is being done in America. We haven't at this stage got to get too involved.

JB: Because Pioneer is the champion of the LaserDisc format, our prime area of interest is what is happening with Digital Video; FMV or DV or Video CD, call it whatever you like. At the end of the day we are selling LaserDisc players in the UK and throughout Europe, we're not as yet selling LaserActive machines.

Edge: Do you think you'll be working with Sega Europe when the PAL machine is available?

JD: I'm sure we will be. Once the dates have been decided for a European launch, we will be talking to Sega, and Pioneer of Europe, because we're talking about a pan-European launch not just a UK launch.

'People ask, why don't you produce a machine that does everything? Pioneer are now closer to that than anyone'

Jason Doran, marketing manager, Pioneer UK



Pioneer also manufacture the perfect accompaniment to LaserActive: this rear-projection TV has an impressive 50-inch screen

Edge: Are you worried about the advent of MPEG Digital Video and films on CD?

JB: Whilst Pioneer is still a great champion of LaserDisc, and it is still the best quality video format you can have, Pioneer haven't had their heads buried in the sand. They're actually way ahead of the game with Digital Video technology, and interestingly a lot of that research is happening in the UK. One of our subsidiary companies, called the Pioneer Digital Design Centre, based in Bristol, are designing silicon and they are way ahead of the game on digital video encode and decode hardware.

Of course, in the domestic arena everyone's getting excited about movies on CD; which is new in consumerland, but in Japan they've had industrial karaoke systems, operating with full motion video off of a CD, for two years now. That was launched by JVC.

Pioneer thought, 'Hey, we can do better than that,' and they launched one about four months ago, using the latest chips that have come out of our research facility, and the results are mindblowing. It's a closed loop system: it will only play Pioneer discs because they are high density discs, called the Alpha Disc. And while the data rate of CD-i is 1.5 megabits/sec the Pioneer system is three times faster. *Three* times.

And that's Digital Video, but they're still not happy with it. They want it to be better still: they made that machine because market forces demanded it – karaoke is big business in Japan.

Edge: What's the thinking behind LaserActive? It is, after all, an expensive, high-end piece of kit.

JB: Mankind seems to be obsessed with making things smaller and more convenient. What LaserActive shows with video and games and so on, it's like, well, how about trying to make something really tasty, not just cheap and convenient. Something

High Roller Battle (Mega-LD)

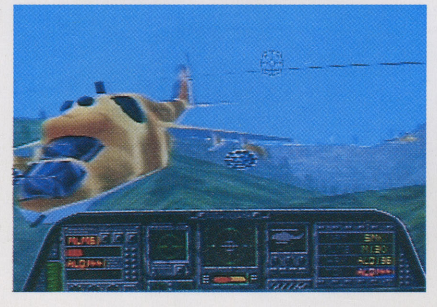
Pioneer are themselves developing LA software, including the 3D helicopter gunship game, *High Roller Battle*.

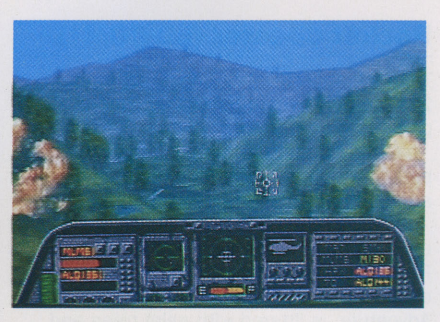
In your war against the Jurak forces, you have to infiltrate the enemy's territory and destroy their secret bases across seven missions.

As with other LaserActive games, your mission destination is fixed, and the route precalculated. You have control over the targetting crosshair, and have to set your aim, lock on the right target and fire.

A large part of the game is the correct choice of weapons available to you at the start of each mission. Each mission has different requirements, as explained during a pre-briefing session. Knowing what you're up against, you must choose the right balance of cannon and missiles: select the wrong weapons and your armour won't be as effective against the enemy.

The graphics again are beautifully rendered, and everything whizzes along at a fair old rate. Successful kills are also rewarded with satisfyingly well animated explosions.





Pioneer's *High Roller Battle* puts you in control of a helicopter gunship. Your path is fixed, so you simply have to target enemy craft (left). Downed craft explode in the woods far below (right)

that is better than we had before. And I think that was Pioneer's reluctance to get involved with Digital Video right now because they know that LaserDisc is still the best.

Edge: So will Pioneer ever make a LaserActive MPEG cartridge – or dedicated DV players?

JB: Yes I'm sure that Pioneer will if market forces determine that they have to. And we wouldn't have to ask for anybody's help; we could do that, we could put a chip in there that was better than anyone else's chip, that can work three time faster.

Edge: Are you worried by the advent of Digital Video?

JB: I've been trying to force the head honchos at Tokyo to say where do we stand on this, and what comes back is pretty plausible and pretty credible, which is that LaserDisc won't be around for ever; technology is marching on at an astonishing rate. But Pioneer reckon it's going to be seven or eight years before we have Digital Video that's anywhere near as good as LaserDisc.

Also, imagine if you had a press release every Monday, that announced ten new [Digital Video] films. Ten – every Monday morning. It'd be, 'Wow, look at this!' But if you work it out…

JD: I have: it would take 15 years to get to the same catalogue as is currently available on LaserDisc. Because of all the complications and politics involved in getting a film out on LaserDisc.



Pioneer's UK headquarters in Slough. With LaserActive, the Japanese hi-fi specialists are hoping to break into the cutthroat videogame/multimedia market

JB: We think we've got a great library now of movies on LaserDisc, but I tell you, you've really got to go some with all the legal and contractual stuff, sleeve artwork, to do ten a month.

JD: We'd be lucky to get five out a month, on a good month.

Edge: How do you intend to position LaserActive in the marketplace?

JB: It's definitely a LaserDisc player that plays games; it's not a game machine that just happens to play LaserDiscs. And that's what gives it its edge: it's a machine that isn't useless, because from day one when you buy it, it plays currently available titles. Imagine if you're an America now, it plays all those LaserDiscs that are becoming a way of life in the States: it's more than one percent of households now, it's big. So forget LaserActive: 'What? There's only five discs available?' Well forget it then. It's still a LaserDisc player. And it plays audio CDs. And if you're into games, then buy one of the packs and it plays currently available software, it plays Mega CDs and PC Engine stuff.

So even though there isn't very much Mega-LD and LD-ROM² software, don't buy the packs if you don't want to: wait.

JD: From a marketing and consumer point of view, LaserActive is both a testament and an endorsement by Pioneer to the laser optical format, which everyone is now familiar with, thanks to the advent of CD; and also an endorsement of the whole

Continued next page

PC Engine problems

Already, some incompatibility problems have arisen with the CD-ROM² system.

Pioneer have had to issue a list of eight software titles that won't run with LaserActive's PC Engine pack: *Juuooki* (NEC Avenue), *Pastel Lime* (Naxat), *Graduation* (NEC Avenue), *Wizardry I and II* (Naxat), *Moonlight Lady* (NEC HE), *A Reisha De Ikoo 3* (Artding), *Super CD-ROM Experience Soft* (Hudson Soft), and *PC-Engine Hypercatalogue* (Shoogakukan).

No official explanation has been forthcoming from Pioneer regarding the discrepancies in NEC's hardware.

However, NEC themselves are unworried, as the software was released before LaserActive became available.

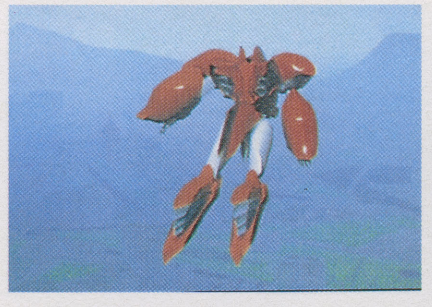
Vajra (LD-ROM²)

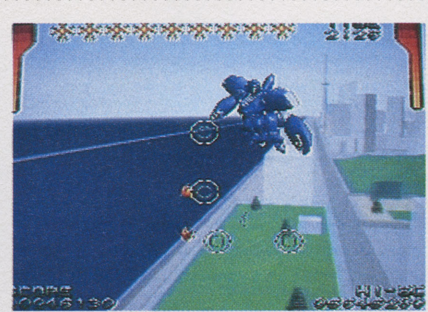
Pioneer are also sourcing tiles on the LD-ROM² format. The first of their efforts is *Vajra*, a firstperson shoot 'em up, featuring some very lovely rendered Japanese combat robots.

Set against a 3D landscape, each stage is a one-on-one dogfight with one of the huge hovering mechanoids.

Fully rendered images set the scene for the forthcoming battle, at which point the robot is displayed using NEC's hardware. The enemy characters are fully 3D animated, flying into and out of the screen, turning, rotating, etc. Each robot employs 100 different sprites to give the impression of realistic 3D movement.

Again, the player can only exert control over the gunsight and is merely swept along with the visuals.





Stunning rendered images ably set the scene for *Vajra* (left). Pioneer's LD-ROM² game has you dogfighting huge flying Japanese robots, in an unusual but playable shoot 'em up

The landscape scenery moves very quickly which, combined with the impressive 3D animation, makes *Vajra* one of the more impressive titles to come from Pioneer. Sadly, the LD-ROM² format means that UK gamers won't easily be able to get their hands on it.

LaserActive

The Sega connection





The LA controller (top) and Sega MD module (bottom)

Because of the lack of official PC Engine software, the only plug-in modules available to UK LaserActive owners will be the karaoke pack, and the Sega Mega Drive pack (which will probably come bundled with the system).

With the Mega Drive pack slotted in, LaserActive then plays Sega carts, Mega CD discs and also the joint format Mega-LD discs.

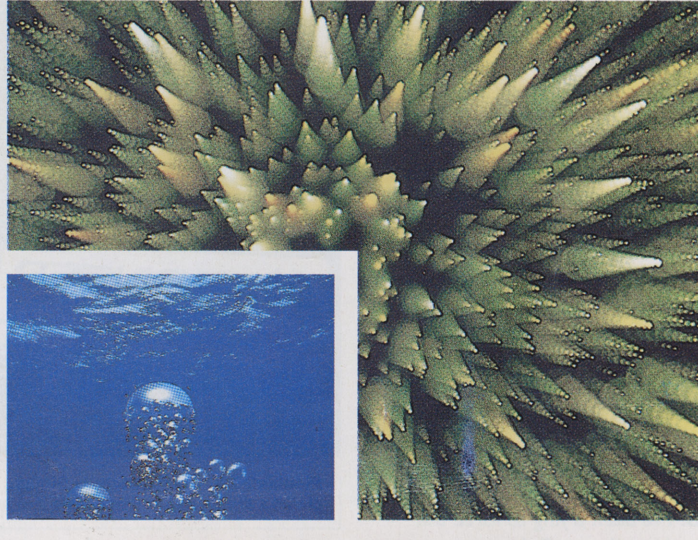


ethos of moving towards a home entertainment machine. People are demanding more from their home entertainment; they want more from their TV and their hi-fi and we've seen a huge boom in the games market. The growth is phenomenal and we'd be silly not to be in that market.

What LaserActive is basically saying is that Pioneer is at the forefront of the technology. People are always saying, why don't you just develop a machine that does everything? Well Pioneer are now closer to that than anybody else. We're now developing a machine that can almost do everything. I'm sure the machine could, if we wanted it to, play CD-i as well. Politically we won't do that, but there's a machine that could basically do anything. And I think you're going to see more companies move towards that.

With price, availability and quality of software so far against them, LaserActive hasn't got off to the best of starts. You could argue that it's in the same position as Philips' CD-i was about two years ago; but in two years' time LaserActive will be up against the likes of Saturn, PS-X, Jaguar II and possibly 3DO 2 and CD-i 2.

Another case of too little, too late, perhaps?









LaserActive titles from the sublime to the ridiculous: *3D Museum* (top right, top left), a library of animated images; *Virtual Cameraman* (bottom left) a candid photography simulation; and something that looks suspiciously like strip Mah-Jong (middle, right). (You should see the picture we *didn't* print)

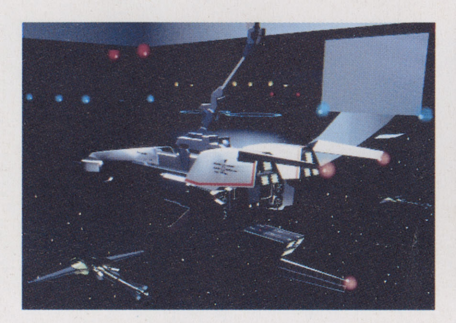
Space Berserker (Mega-LD)

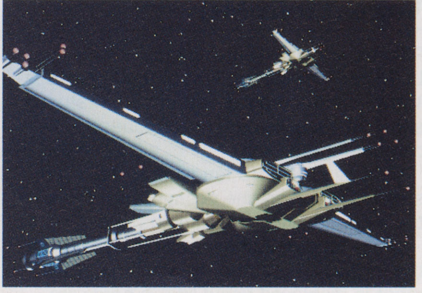
One of the most impressive looking LaserActive titles is Pioneer's Mega-LD title, *Space Berserker*, a 3D shoot 'em up which features glorious rendered spaceships.

The fate of humanity hangs in the balance: alien aggressors have in their possession the eponymous 'Space Berserker', a device that far surpasses your simple beam weapon, and gives them the upper hand in the approaching conflict.

The United Nations Of Earth decide to launch a sneak attack in order to destroy the Space Berserker before it can be turned on your home planet.

Spearhead of the UNE assault is the Valkyrie fighter squadron, of which you are a member. During the conflict, your cockpit graphics include video images of your wingmen, and a female operator who proffers advice and instructions during each stage of combat.





The rendered spaceships of *Space Berserker* (above) wouldn't look out of place in The Last Starfighter movie. Of course, tying these into a playable shoot 'em up is another matter...

Space Berserker looks a lot more together than other LA titles. Certainly the graphics alone put it near the top of the LaserActive 'must play' list.

CONSPIRACY



The KGB or Committee for State Security was the most feared and pervasive intelligence gathering network in the world.

It literally controlled the lives of Soviet citizens from the cradle to the grave.

The player is cast as GRU captain Maksim Rukov who has been mysteriously transferred to Department P of the KGB Second Directorate in Moscow.

Department P was founded in Perestroika's heyday. Its function was to investigate possible cases of KGB corruption. As the player sets out to discover the murderer of private detective Golitsin, the stench of treachery and deceit becomes more and more overpowering.
Who can he trust?

His dead father. Donald Sutherland is digitised with video and sound and placed in CONSPIRACY's extensive help system for use throughout the game.

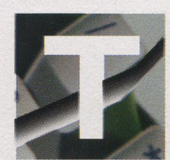
Virgin



Photograph: **Peter Canning**

What's **wrong** with the PC?

The PC is one of the hot games platforms at the moment. But is its reign already under threat? With new machines waiting in the wings, **Edge** explains how the very standards that defined the PC in the first place could ultimately be its downfall

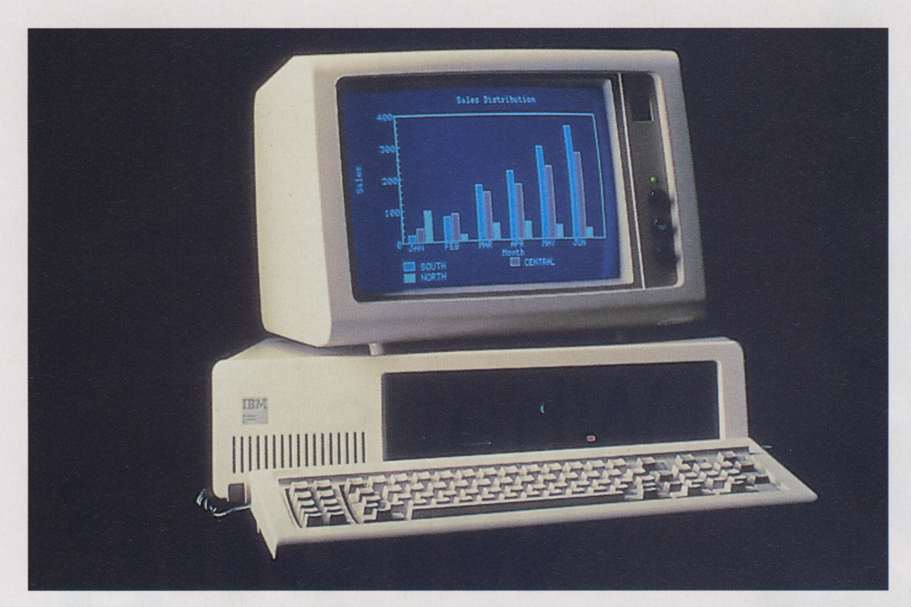


The IBM Personal Computer is a rare example of a machine designed from the beginning to be adaptable. There are few, if any, consumer electronic designs that have lasted as long as it has while maintaining the same basic architecture.

But back in 1981, even its far-sighted designers couldn't have predicted the evolution of the PC over the next 13 years.

Continued next page

PC



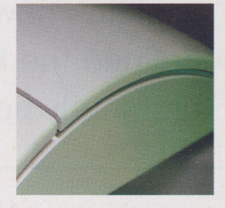


The machine that set the whole thing in motion: the IBM XT. Back in 1981, to own one of these was pretty fashionable, but now XTs and even the later 286 ATs are relegated to the technology trashcan

Continued

'It's inevitable that the PC will fall behind the power of the new consoles from Sega and Sony – they've been designed specifically to generate polygons. What Intel need is a redesign, and I don't think the answer lies with the Pentium'

Peter Molyneux, Bullfrog Productions



Whereas it was hard to imagine at the start of the '80s that anyone could use the whole 640K of a PC's conventional memory, it's now harder to believe that anyone could design such a stupidly low memory limit.

And it gets worse. The PC's narrow expansion bus, originally 8bit and now 16bit, has also been a major restriction in its development. The original IBM PC used an 8bit bus – in other words, data could travel between internal components 8 bits at a time. This was fine, as the 8088 processor it worked with only had an 8bit internal architecture. That situation soon changed, though. IBM's PC AT increased the Industry Standard Architecture (ISA) bus width to 16 bits, but the arrival of the 80386 and 80486 chips in 1985 marked the advent of 32bit processors.

The introduction of the Intel 64bit Pentium last year meant that the bus width had to increase again. Things were much more critical this time, though, as PC processors were running at speeds of up to 66MHz, compared to the original IBM PC's 4.77MHz, while the main expansion bus was still trogging along at 8MHz. The result was that the processor was always waiting for its peripherals (graphics board, hard drive, etc) to catch up.

The industry's solution was the cheap and cheerful Vesa Local Bus (VL-Bus) standard. The Local Bus system links internal components in the same way, but works at the same speed as the processor, with very little buffering between the two. This may sound enough, but the lack of buffering puts a bigger load on the processor, restricting the number of Local Bus slots to two or three at most. So PCs still have to have both VL-Bus and ISA bus slots in them – hardly the total solution everyone was hoping for.

And that's not the end of the story. PC chipmakers Intel had reached the same conclusions about bus width as the Vesa group, and were meanwhile working with a different group of industry names on their own Local Bus system, Peripheral Component Interconnect (PCI). PCI runs at 25MHz or 33MHz, not at the same speed as the processor, and has more buffering which means less load on the processor. It's a better technical solution, but much more expensive to design.

At the moment, the VL-Bus has the lead in the market, with PCI restricted to 64bit Pentium machines. But Intel believe there will be a dramatic increase in the number of PCI machines in the next year. They have also hinted at a retro-design of older 486DX boards to include PCI buses, which could tip the scale in favour of PCI.

But what began as a way of improving the PC standard has ended up with two competing expansion architectures and has done nothing about possibly the worst problem, the bag-tie around the PC memory map.

But it's not the Intel chip architecture that limits a PC to 640K of conventional memory. This is a limit imposed by the design of Microsoft's disk operating system, MS-DOS. Since the first version of DOS, memory segments have been allocated for video, drive buffers, even

Inside the PC

Photograph: Peter Canning

1 3.5inch floppy-disk drive – in this case the unit stands on its side. **2** CD-ROM unit – the 300K/sec double-speed drive gives this machine MPC1 compatibility, making it suitable for use in multimedia applications. **3** The hard drive that lies at the heart of the machine. Capable of data transfer at about 800K per second, and able to store (in this case) just over 200 megabytes of binary code. **4** The video adaptor. Many modern PCs use a Local Bus connector for the most performance-critical hardware in the machine, ie the graphics board and (optional) disk cache. This board sits in a Local Bus slot, but is in fact only a standard 16bit card. **5** The drive controller card, which handles the flow of data between the floppy and hard disks and the motherboard. This card also controls the two built-in serial ports, and the parallel port, which are used for connecting a printer, mouse, joystick, or other communications device. This card also plugs into a 16bit slot on the motherboard. **6** The power supply. Opening up the casing and pouring a glass of water inside will damage the functionality of your machine considerably. **7** It's obscured, but here lies the machine's 33MHz 486DX processor

Chips with everything

Intel have maintained a stranglehold on the market for PC central processing units (CPUs). One look at the range of chips they offer and you can see why. These are the principal chips in the Intel product line (right)

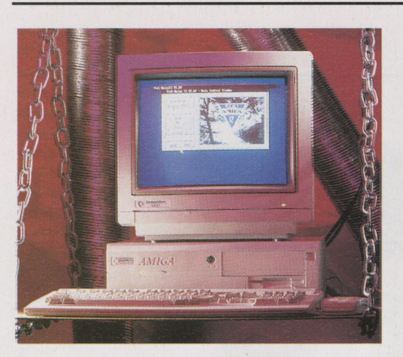


1. The 8086 processor, which dates way back to 1978. The newly designed 16bit architecture in this chip was created specially to fill the gap while everyone was waiting for the completion of the iAPX 432 CPU. This design proved to be something of an inspiration, and set the standard for all the later designs of PC processing units



2. The 8088 processor, launched in 1979. This was the first 16bit processor with an 8bit internal architecture. IBM chose this as the processor for their first mainstream Personal Computer, The IBM PC. Running at 4.77MHz, the PC looks pretty sad by today's standards, but it was this little lump of silicon that first made an affordable home computer possible

PC



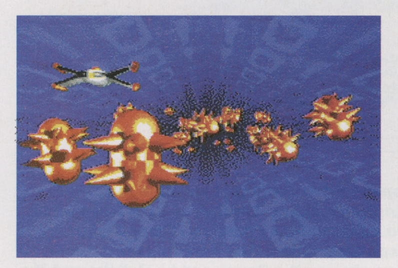
The A4000 is the Amiga equivalent of a 486 PC, but the A1200 is much cheaper

PC rival Number 1: Amiga

Commodore's Amiga has until recently had a much stronger games presence than the PC. The first Amigas had a 68000 chip, coupled to custom sound and graphics chips, which gave the machine its gameplaying edge. The introduction of faster versions of the same Motorola chips (the 68020 and 68030) in the high-end machines has maintained parity with the PC.

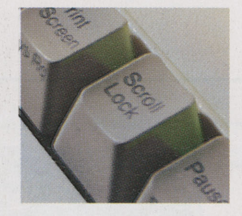
The Amiga has no problems with memory architecture: it is able to address its entire memory map as one contiguous spread, rather than having to chop everything into segments as the PC has to do.

The 32bit Amiga CD32, though a games console rather than a personal computer, has shown what can be done for gamers with the Amiga architecture.



Stardust uses an Amiga custom chip to do things PCs owners can only dream of

Continued



a cassette tape interface at the top of available memory. In the original PC, 1Mb was the total available memory and it was the top 384K which held all these buffer areas.

When new machines arrived, the maximum memory size increased, first to 16Mb, then 64Mb and 4Gb, but the 384K remained sacrosanct. This limitation leaves a hole in the machine's memory in which only certain segments are available. The PC can only use extra memory by viewing it through a 'window' in the 384K (EMS memory), or by using memory from 1Mb up (XMS memory). It will take a fairly fundamental change in the operating system, incompatible with previous versions of MS-DOS, to remedy this.

Several games houses have solved this problem by dispensing with MS-DOS altogether and using it only to start up their own simplified operating systems, which map memory differently. You'll have to wait a bit longer for the operating system itself to offer this same versatility – unless you can afford to run the high-tech *Windows NT* (New Technology) or *OS/2*.

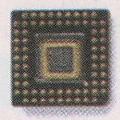
The solution could be nearer than many thought, though. Version 4 of *Windows* (currently on version 3.1), otherwise known as *Chicago*, is expected to map memory as a continuous whole, and all programs designed to run under it will be able to use the full map. It should also run in Protected Mode, so that one *Windows* program, even a game, can't pull another one over if it crashes. If the operating system in a future release of *Windows* is fast enough for games to use, we may at last see games able to load without you having to sell your soul to get the required amount of free memory.

***Chicago* could** also solve the other problem that frustrates PC users. Most peripheral devices make contact with the processor through a system of interrupts – software commands which literally interrupt what the processor is

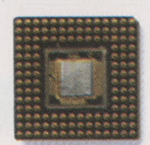


Photograph courtesy: **Digital Equipment Co. Limited**

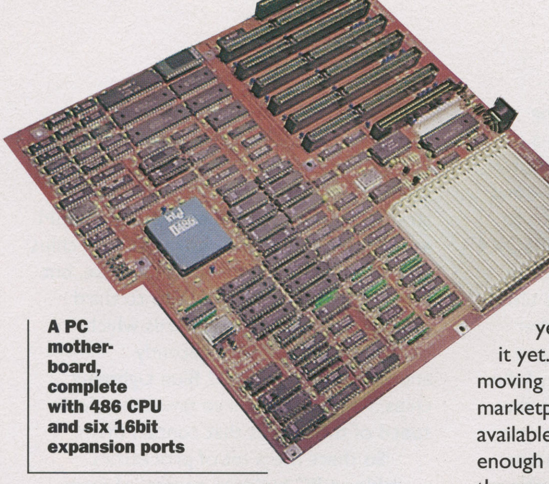
The DEC Alpha AXP isn't strictly speaking a PC, but it can run *Windows NT* and other *Windows* applications. It uses a very fast 66MHz RISC processor, but is decidedly expensive



3. The Intel 286 processor, from 1982. At its introduction the 80286 provided about three times the performance of any 16bit processor on the market. Aimed at the high end of the 16bit market, it featured on-chip memory management, enabling users to conduct different tasks at the same time. It was the chip used in the second-generation IBM AT machine



4. The Intel 386 CPU, which appeared in 1985. This was the first microprocessor to extend the binary compatibility of the Intel architecture family to 32 bits. The 386 uses 275,000 transistors, and runs at what was then considered a mindbending speed, 5 million instructions per second (MIPS). The 386 is now considered the entry-level processor for the PC



A PC motherboard, complete with 486 CPU and six 16bit expansion ports

doing and force it to pay attention to their needs. Each peripheral has to have a unique interrupt and the overall number of interrupts is limited.

Many devices also require direct access to the PC's memory through a Direct Memory Access (DMA) channel, which again has to be unique. Allocate the same interrupt or DMA channel to two different peripherals and you're very likely to crash the machine.

Intel are working towards a solution for this problem as well, with a system they call Plug And Play. The basic idea is that cards should declare themselves to the rest of the system when they're first installed and the system will then automatically allocate them an unused interrupt and DMA channel, thereby avoiding conflicts.

The first stage of Plug And Play will be built into the *Windows 4* operating system and will report the interrupts and DMA channels currently in use so you can allocate them successfully by hand. And about time too, eh?

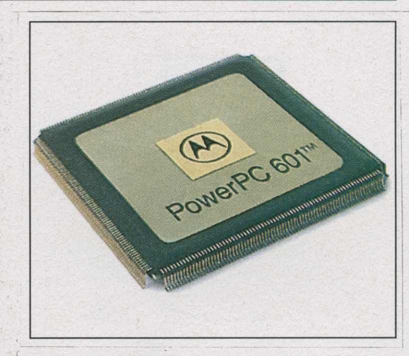
> **'Because the PC's hardware performance goes up in gradual steps, unlike consoles, games development has been more sustained and programmers are more proficient on the machine. The compatibility issue is becoming increasingly worrying, though'**
>
> **Colin Bell**, Digital Image Design

The 64bit Pentium may have been launched last year, but not many people have seen it yet. Intel concede that Pentium is moving very slowly into the PC marketplace. Very few Pentium chips were available in 1993 and the prices were high enough (about $1,000) to discourage all those without a genuine need for the extra performance Pentium has to offer. But according to **Simon Muchmore**, market development manager for Intel: 'We are making seven million Pentium chips this year and we intend to sell them all.'

If Intel can fulfil their promise to make seven million chips, they're going to have to cut their price to sell them all. Intel expect Pentium sales to be about 17.5% of the estimated total of 40 million PCs sold this year, but this assumes two things: firstly, that people are going to be able to afford the new systems; and secondly, that there is a noticeable difference in speed between a Pentium and a 66MHz DX2 chip.

Everyone saw great increases in speed with the 486DX2; although the 66MHz chip only works at this speed internally, not when fetching instructions or data, it still gives nearly twice the speed of the 33MHz DX chip. And it doesn't need faster memory or support chips to do it. This

Continued



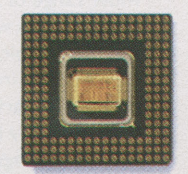
The Motorola 601 PowerPC chip runs at speeds between 60MHz to 80MHz

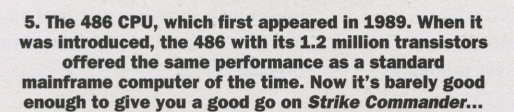
PC rival Number 2: **PowerPC**

Still to appear in significant numbers, the PowerPC represents an attempt to break the stranglehold Intel have on the processors in most personal computers. It's a Reduced Instruction Set Chip (RISC), which means it has an internal structure much less complex than Intel 80XX series processors, all of which are Complex Instruction Set Chips (CISCs). The simpler structure of RISCs means that program code for business applications or games alike can run a lot quicker on them than on CISCs. The 60MHz PowerPC 601, for example, is claimed to be up to five times faster than the equivalent Pentium processor.

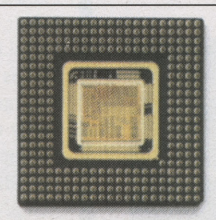
The main problem with the PowerPC in its attempt to take over the PC market is that it can't directly run code intended for Intel chips. The way around this is for the chip to use software emulators, like *SoftPC* on the Macintosh. In fact, the authors of this emulator are currently working on a version for the PowerPC which should enable it to run PC applications, though games code will probably struggle to work on it.

However, if the PowerPC catches on we may see games written in the chip's native code. These would certainly be something special – the chip's architecture is clean and the processor is very, very fast.





5. The 486 CPU, which first appeared in 1989. When it was introduced, the 486 with its 1.2 million transistors offered the same performance as a standard mainframe computer of the time. Now it's barely good enough to give you a good go on *Strike Commander*...



6. The 64bit Pentium chip, introduced officially in 1993. The Pentium is claimed to offer five times the performance of the 33MHz 486DX chip. Legal problems stopped those imaginative types at Intel naming this chip '80586', but it's often referred to as the P5

PC



The Macintosh Quadra 610AV is a fully specced multimedia machine

PC rival Number 3: Macintosh

The Apple Macintosh suffers from few of the architectural legacies of the PC. It's always had a consistent memory map, uses the same family of Motorola processors as the Amiga and offers colour graphics to rival the PC's VGA standard.

The Mac has been an artist's machine almost since its evolution from the Lisa, and has a wealth of graphics applications, from drawing and painting to desktop publishing. Games are thin on the ground, though. Mac sales are a small fraction of the PC's, and a smaller market and higher perceived prices for Macintosh kit have discouraged games houses from writing for the machine. Apple's *QuickTime* video system is similar to Microsoft's *Video For Windows*, so we may see a new breed of animated adventures hitting the machine, as is happening on the PC.

The latest proposed Macs will have a degree of PC compatibility, through use of the PowerPC chip developed by a joint venture between Motorola, Apple and IBM. The PC part will be run in emulation, though, so it's doubtful that top-flight PC games will be persuaded to run on it. Apple also recently showed a version of the Mac Quadra, codenamed Houdini, which contains a 486SX chip and is able to multitask in both Macintosh System 7.1 and MS-DOS – so the days of Mac/PC rivalry may be coming to an end.



***Journeyman Project*, for Mac CD-ROM, uses *QuickTime* animation routines**

Continued



clock-doubling procedure is a guarantee of faster performance – and Intel are about to release the 486DX4 processor, which runs at three times the speed of the standard chip. In other words, the 99MHz 486DX4 should give nearly three times the performance of the 486DX33, or around 33% more than the 66MHz 486DX2.

But unlike the guaranteed increases with the DX4, the Pentium may not show any difference at all with many applications. Under recent application tests, the Pentium chip offered only about a 15% performance increase over a 486DX2 66MHz. Intel claim that with optimised code, you can achieve a 50% increase with a Pentium. But no-one's going to produce optimised Pentium programs until there are more of the chips around. And even then, there are still few language compilers optimised to produce Pentium code. Indeed, according to Simon Muchmore, 'Most PC games still use compilers geared up for 16bit 386 processors. We want to get the compiler manufacturers to produce 486 compilers first. That should provide a speed increase of around 30%.'

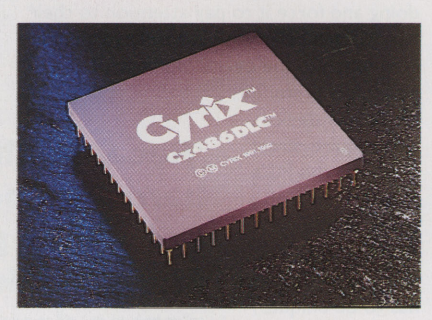
So, game code has a long way to go before it starts needing the improvements in performance of the Pentium architecture. The day when incredible 64bit 3D games on the PC become a reality is still some way off.

If the Pentium really can provide a 50% performance increase at 60MHz, and the rumours of 80MHz Pentiums come true, there should be a new range of fast chips by the end of 1994. How much they will cost in new PCs is still uncertain, but Intel intend Pentium to outsell 486 processors during 1995. For this to happen, the price *has* to drop.

But for once, maybe the price decision won't be exclusively Intel's. Although Intel have a wider range of chips in personal computers than any other manufacturer, and are the world's largest chip producers, their competitors have, after many years of legal battle, won the right to make rival chips to the 386 and 486 series. Intel's main competitors are AMD and Cyrix, who are only too happy to step in and plug the gaps in Intel's range. Both companies are producing 40MHz versions of the 486DX chip, and both claim improved internal caching over the Intel chip. Caching is a technique used to reduce the number of times the chips have to access memory.

Neither AMD nor Cyrix have yet announced clock-doubling chips, though. For a clock-doubled chip you still have to go to Intel itself, or to IBM, who have a strange licensing agreement with Intel. IBM are entitled to use the designs of Intel chips and to modify them for their own use, but aren't allowed to sell the chips to third parties, only the system boards which contain them. IBM have recently announced the 486SLC2 Blue Lightning chips, which run at three times the clock speed of the boards that contain them.

So there are a lot of processors available to PC builders, several of them yet to be seen in working machines, and



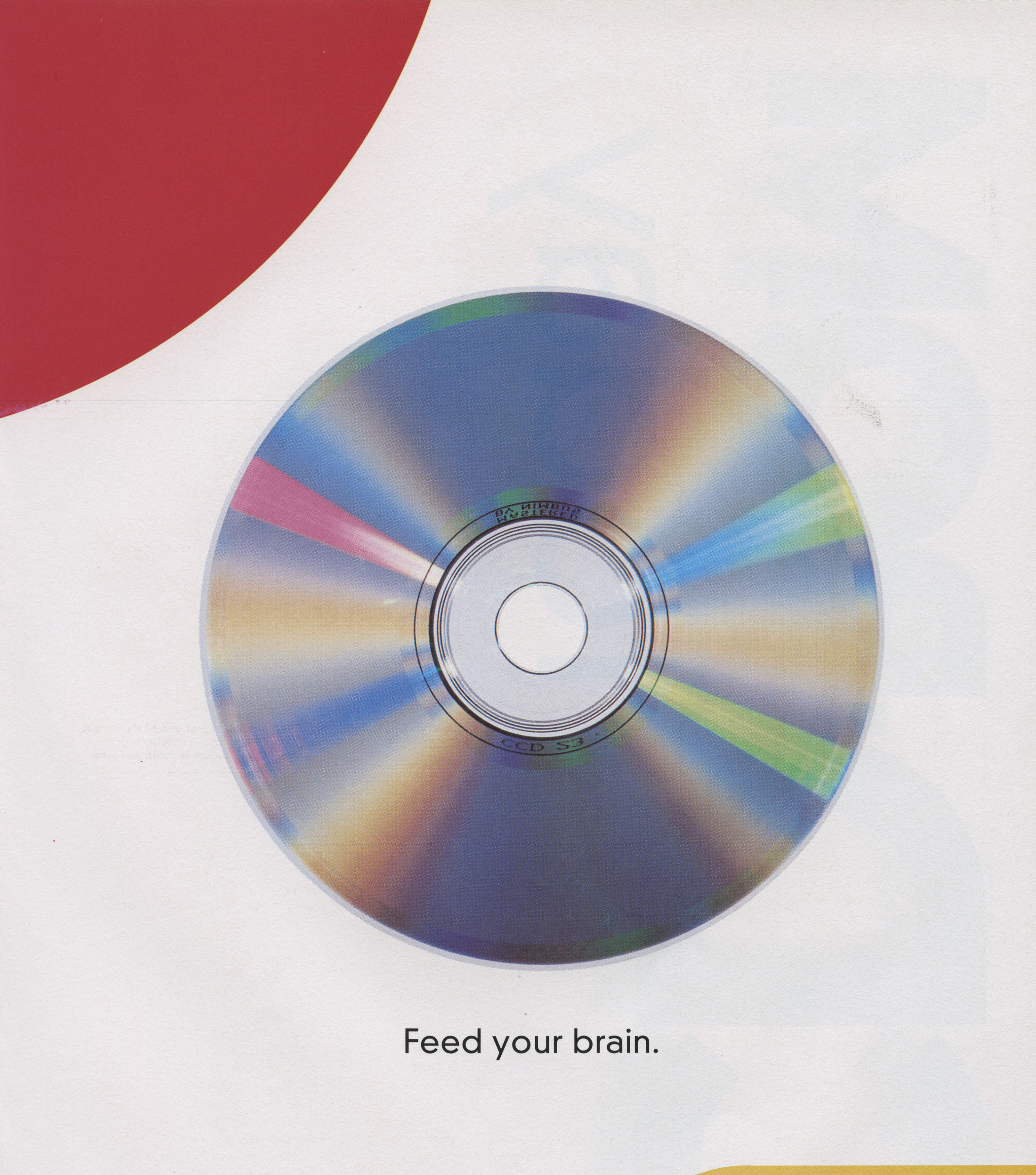
The Cyrix Cx486SLC is just one of the recent rivals to the Intel range. A lengthy legal battle was needed before it could be made

little shortage of processing muscle in the PC marketplace. The results of litigation, though, most of it from Intel, may reduce the choice again. Intel guards what it considers its intellectual property rights very jealously and there are several long-winded US cases concerning PC processors still to be decided.

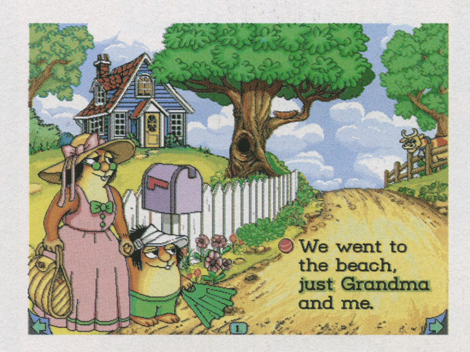
The PC arena may look complicated at the moment, but it is in a major state of flux. The bottlenecks in the machine's architecture have been recognised and are being addressed. While the final dominance of PCI over VL-Bus isn't yet clear, Intel have the commercial muscle to nudge the market the way they want.

They certainly have the marketing know-how to push the Pentium chip into a wider range of PCs, and the introduction of the DX4 chip will further speed processing and the complexity of available games.

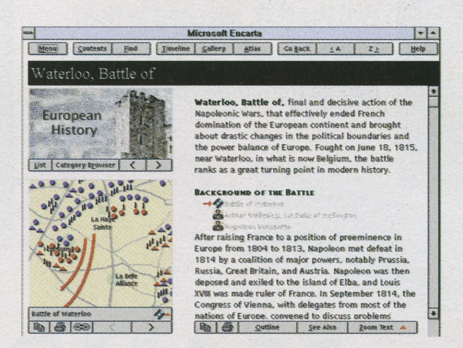
And the introduction of *Windows 4* may finally mark the end of the archaic 640K memory barrier. Maybe then, PCs will come of age and finally start to be considered the universal tools, suitable for both work and play, that IBM intended them to be back in the days of the original XTs. E


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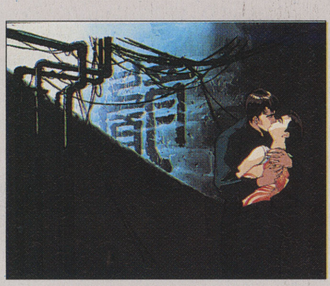


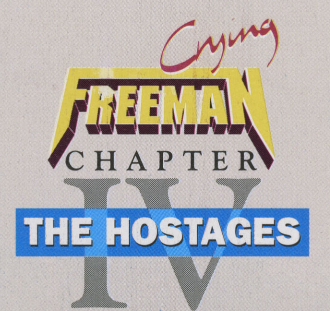
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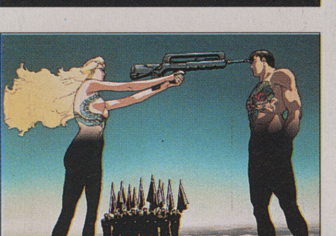
We'd like to help you explore the amazing new world of CD-ROM for the Mac and PC.

Our magazine, complete with 600Mb disc, is out on March 31st – Easter weekend. See you then!







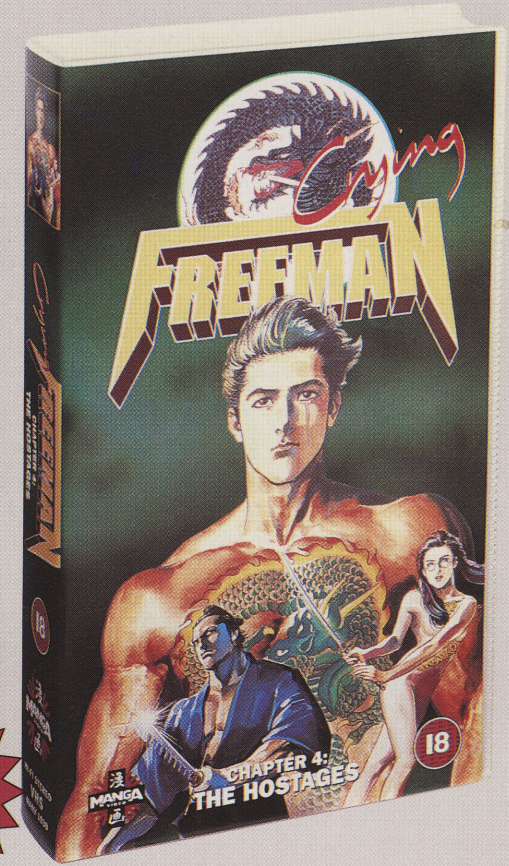


Chapter 4 of Crying Freeman - The Hostages. This chapter is as hard-hitting as the first. The K.O. - a world terrorist syndicate - kidnap three members of the Wong family, the notorious heads of Los Angeles' Chinatown. When Freeman steps in, the trap snaps shut. Will the K.O. succeed in their plan to engulf the 108 Dragons and so dominate the world?



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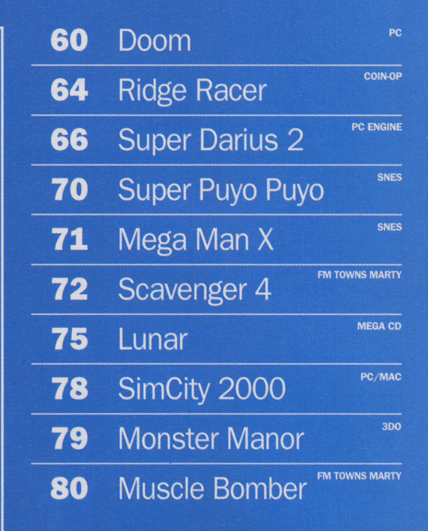


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Doom: Evil Unleashed Ridge Racer **Super Darius 2** Super Puyo Puyo **Mega Man X** Scavenger 4 **Lunar The Silver Star** SimCity 2000 **Monster Manor** Muscle Bomber

Testscreen



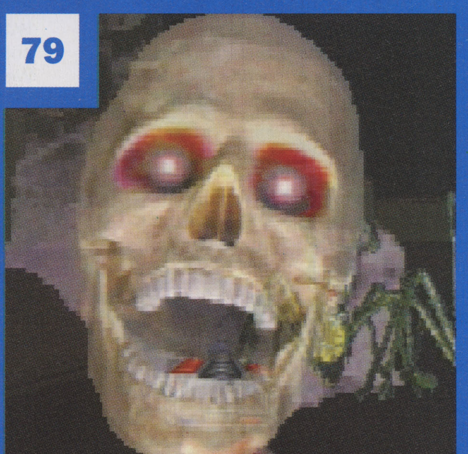
A worrying trend in this issue's Testscreen section is the relative dearth of truly impressive software.

Ridge Racer doesn't count, as it's a state of the art coin-op, and *Doom* is great – but only when it's running on a 66MHz 486 PC.

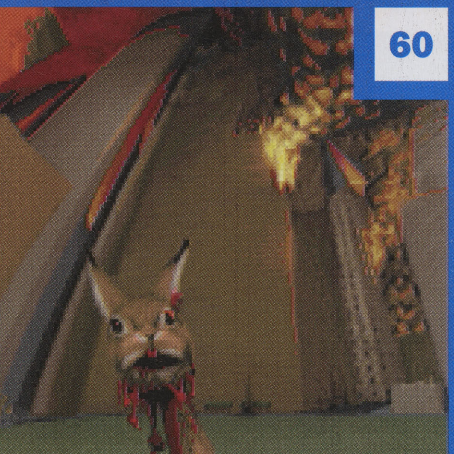
Even the SNES is lacking in quality software these days: the only titles we found worth looking at are *Mega Man X* and *Super Puyo Puyo* – no great shakes technically, either of them, but high in the playability stakes.

And the situation on the Mega Drive is even worse. Foregoing the thrills of *NBA Jam* and *Jurassic Park CD, Lunar* on the Mega CD was the only title that grabbed our attention.

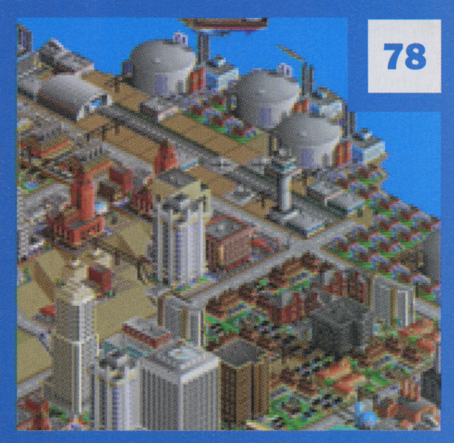
So, oddly, it was left to the FM Towns Marty to provide the highlights. Psygnosis hit paydirt with *Scavenger 4* – a title we'll be seeing a lot more of on other CD systems, so remember where you saw it first.



79



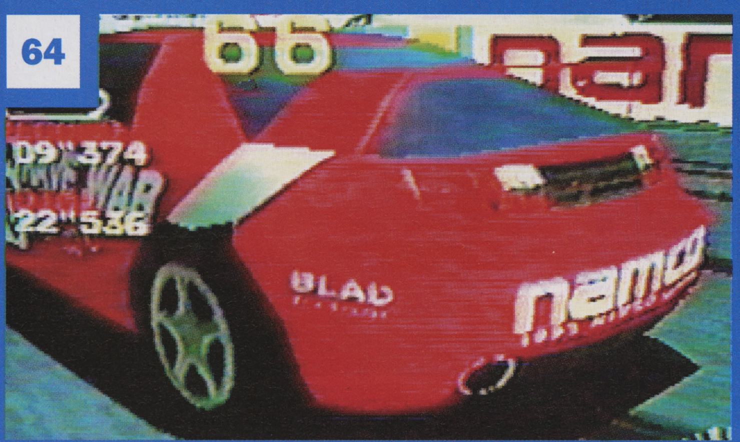
60



78



75



64



72

Doom: Evil Unleashed

Format: PC
Publisher: Id Software
Developer: In-house
Price: Shareware: £35 for next two episodes
Size: 4 disks
Release: Out now

It doesn't seem rational, does it? Along comes a fairly simple 3D-perspective maze adventure/shoot 'em up, and suddenly hundreds of grown men start acting like they've never seen a videogame before – and even the normally sober PC press are turned into gun-mad fanatics. Huge ratings, rave reviews across the board... No-one could deny that Id Software's *Doom* has caused quite a stir – on both sides of the Atlantic. And that's before the full version is even out in the shops.

It's got to go down as a marketing coup: by releasing the first episode of their new game as shareware, Id have managed to whip up and control a vast torrent of nigh-frantic bulletin-board trading. Well, you write a game as immediately playable as *Doom* and ship it with the message, 'please distribute like crazy' and you're guaranteed a big audience. And *Doom* looks like following its forerunner, *Wolfenstein 3D*, in becoming *de rigeur* games software in offices and homes throughout the Western world.

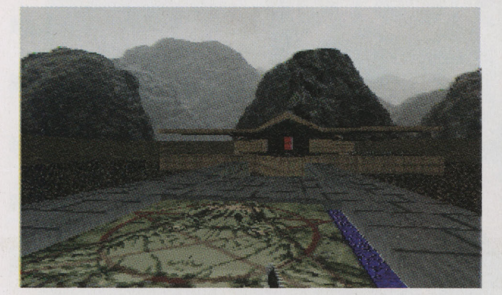
Basically, the way it works is that the first episode of *Doom: Evil Unleashed* is free. Anyone can get hold of it, and they can play it until they're sick of it – or can just discard it straight away if they don't like it. The next two episodes you have to pay for. So get hooked on *Doom* and you'll probably want to buy the rest of it. Interestingly, though, Id Software are also planning to release a more conventional all-in-one, buy-it-in-the-shops version of *Doom* later this year.

One thing that this distribution policy ensures is a vast, vast audience. Almost every PC in the world seems certain at one time or other to have the code to *Doom* ticking away on it. That obviously means that the game



From the earliest scenes of the first episode, you can tell you're in for a treat with Doom – like the way the mountains scroll totally convincingly behind the windows (above). And the action's all yet to come – like the charging pink shotgun fodder (inset) you meet later in the episode







The range of scenery in Doom is certainly the game's best feature – like the flame-filled caverns (middle), the stunning Alpine splendour of the first level (bottom right), and the fiery views of the second episode – complete with grotesquely massacred corpses (below right). Yep, there's something for everyone here

needs to be kept simple. You don't want anyone losing interest, or being unable to play, because they don't have the manual, or a joystick, or a sound card, etc, etc. And the real beauty of *Doom* – and yes, even a game as undeniably violent as this can have an element of beauty – is the way it works so well within this limitation.

Doom will run okay on almost any hard-disked PC, but play it on a high-end system and it is immediately recognisable as a very, very impressive piece of software, with graphics technology way up there with the *Strike Commander*s and *Comanche*s of this world. And the speed at which it all works is nothing short of breathtaking.

The differences between *Doom* and the now primitive *Wolfenstein* are obvious at first glance. Firstly, Id have got a lot better at clipping sprites in three axes – which means simply that the action in *Doom* happens on more than one level. There are stairs for you to climbs, lifts to find, and aliens firing at you from windows and balconies high above the ground. This adds major new depth to the action – go back and play *Wolfenstein* and you'll laugh at the horrible 2Dness of the 3D perspective. It also makes games like 3DO's →

Power ups

Doom has a healthy selection of power-ups dotted throughout its many levels. Don't expect to survive for any length of time without using them – but be warned, some are very tough to find. Often you'll have to risk a great deal of your health to find the much-needed bonuses listed below.

Health bonus. The most common power-up. Each of the flasks of blue, soothing liquid increases your health rating by 1%.

Medipaks. Take the form of a small white chest with a red cross. Each one gives you a 10% health increase.

Stimpaks. Identical in appearance and effect to the ubiquitous Medipaks. Stimpaks provide a boost of raw adrenaline (or maybe testosterone) to help you along in your mission.

Berserk. This green medical pack is very hard to find and only available on later levels. It gives you the ability to literally tear people apart with your bare hands. It also greatly increases your weapons' rate of fire. The effect of this pack is highly satisfying, but it's shortlived – you can expect to get only 30 seconds' boost.

Invincible. A green orb with a human face in it. As its name suggests, it renders you invincible, for 30 seconds.

Invisible. A red and blue orb that makes it hard for your enemies to see you, particularly in the dark corridors – but although they're firing blind, they still usually manage to hit you.

Radiation suit. This lets you walk through the green/red/blue poisonous gunk without your health going down.

Light amplifier. Another shortlived effect. It allows you to see clearly in the near pitch-black tunnels.

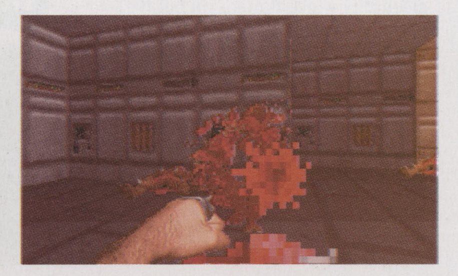
Armour. Wearing armour greatly reduces the impact of enemy fire on you. There are three types: the first is a helmet which bestows a 1% increase; the second is a green chestplate which gives you 100% armour; the last is a blue chestplate which can double your armour.

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Go berserk





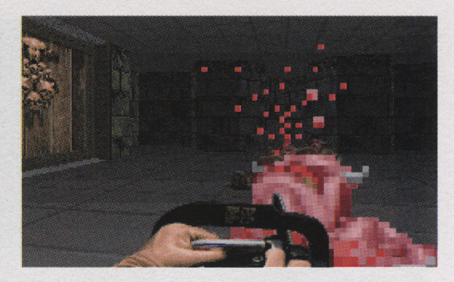


The Berserk mode is only available if you find the power-up – it looks like a small black medipak, and lurks on later levels of the game. The power-up lets you give your guns a rest – you now have the power to tear the bad guys apart with just your fists. Oh yeah, and your spiked knuckleduster

The chainsaw







Ah yes, the chainsaw. A beautiful weapon – even the biggest bad guys don't seem quite so keen on a full-frontal attack after you've just carved up one of their friends like this. The sound effects are about as close as you can get to the sound of a chainsaw massacre as well. What fun

Continued

Weapons

There are seven weapons in all. Each one is brilliantly animated, and the step-up between each weapon is suitably awesome.

Pistol. You start the game armed with just a pistol, but even that can fire up to 200 shots before you need to reload it. If you die during any level you return to the start of that level, again armed with the pistol.

Shotgun. The first weapon power-up gives you a pump-action shotgun. The bad guys no longer fall down – now they're blown clean off their feet.

Chainsaw. The next weapon you can expect is a powerful chainsaw. It's best to only use this for closeup work (although chainsawing through a whole crowd can get slightly messy). With this meaty implement in your hands, your enemies don't seem quite so keen to take you on.

Multibarrel machine gun. Watching those grotesque lizard creatures dance around as the bullets rip into them is deeply, and rather worryingly, satisfying. Get your hands on this and suddenly you start getting into this game in a big way.

Rocket launcher. Not much to say about this. It fires rockets. They embed themselves inside your enemies' flesh. They (rocket plus enemy) explode; blood sprays everywhere. You'll face the bosses of the first episode armed with this gun.

Plasma gun. This weapon is apparently reserved for the second episode. It unleashes a bolt of blue electricity which flattens all but the hardiest of ghouls.

BFG. No prizes for guessing what this might stand for, but it sure is one big, er, gun. Anyone on the receiving end of the BFG's mega-powerful bolt is quickly turned into a small, smoking pile of ash.



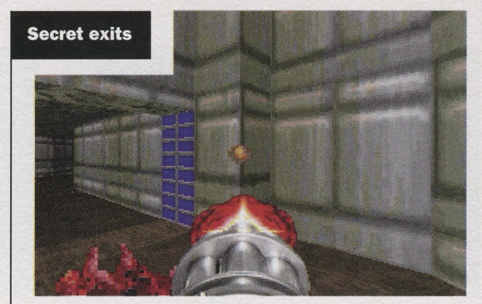
The Exit. It's there on each level, but sometimes it's very tough to find. Sometimes it's even worth a blast or two with your shotgun when you find it. Doesn't really help much, but it makes you feel good

← new *Monster Manor* (Testscreen, page 79) look totally passé before they're even out in the shops.

That said, though, there are problems with the game (Edge has no intention of joining the rabble mindlessly praising *Doom* beyond its worth). Yes, it is good – in fact it's a very, very technically impressive piece of programming – but where's the genuine 3D (look up and down) of *Ultima Underworld*? Where's the variety in the gameplay (it's all just kill, kill, kill)? And looking at it coldly, what is there really in *Doom* (apart from the graphics) to set it above even the most average, most highly repetitive and tedious 2D shoot 'em up?

Okay, there are some visual touches in this game that will literally blow your mind – like the scaling and parallax on the distant mountains – but then everyone said much the same about the hi-res images in *The 7th Guest*. They may look great, but what do you do with them? You don't ever get to explore

Secret exits





Some of the secret panels are almost impossible to spot. But spot them you must if you plan on surviving the horrors of the mazes in *Doom*. Power-ups, big guns, health points... they're all hidden here





Secrets

A totally secret level in the first episode sees you in control of an oversized machine gun, facing a pen of caged lizard creatures in their barracks. It's a psychopath's wet dream... and they can't even fight back

those distant mountain ranges – they're really little more than impressive padding (as in *The 7th Guest*, you're just meant to watch them – in awe).

Doom is certainly a gorgeous-looking game – it has also, incidentally, made serious advances in what people will expect of 3D graphics in future. But the gameplay is as narrow as it gets: you run along beautifully parallaxed corridors and through stunning 3D rooms shooting at a near-endless supply of green lizards. That's it. Still, we're not going to deny that there is a worryingly addictive fascination in watching the frantic despatching of those little green guys.

On the plus side, some of the lighting effects in the game are truly scary. Everyone at one time or another has described some videogame as scary – and as we all know, they're never scary to anyone with an IQ above, say, 12. Well, that's one generalisation that *Doom* shatters: walking through the computer centre with the lights flashing slowly and rhythmically, and turning to find one of those hideous pink beasts running behind you is a seriously intense videogame experience.

It's just a shame that the number of enemies is fairly limited. After a while, the multiple pump-action, blood-spraying demise of yet another pink monster is only marginally satisfying. If whenever you turned a corner you could be met by some new, more grotesquely deformed creature than the last, then at least *Doom* could boast that it had replaced gameplay with real horror.

As it is, once the power of *Doom*'s graphics has worn off (they're amazing, so give that at least a week or two), you'll be longing for something new in this game.

If only you could talk to these creatures, then perhaps you could try and make friends with them, form alliances... Now, that *would* be interesting.

Edge rating: **Seven** out of **ten**

Secrets

As with their earlier creation, *Wolfenstein 3D*, Id Software have programmed hundreds of secret passages into the mazes in *Doom*. You have to explore every wall with great care, and some secret doors are even obscured by objects that you have to blast aside.

When you reach the end of each level, the game informs you of the percentage of secrets you discovered on that level – and you're doing well if you find 50% of them. The secrets in *Doom* really give the game that incredible 'Go back and see what you've missed' element.

Most of the secret doors can be spotted if you look carefully enough. A slight difference in light shading, suspicious metal pillars on the wall for no reason, an alcove just before a doorway – these are the kind of visual clues you should be on the look-out for. All the big power-ups are secret, and to get your first chance at most of the big weapons you'll need to crack the secret passages on each level. Okay, you can just whip through, but there's always that nagging doubt: 'Just what did I miss back there...'

We don't want to give too much away here, but non-secret hunters will in fact miss at least one entire level – the first episode gives you a secret bonus chance to wipe out hundreds of the aliens in their army barracks. But no-one's forcing you to see that bit...







Bosses

There are three main bosses in the three episodes of *Doom*. The pink/brown things are in episode one (top left), a rocket-toting guy (above) lives in episode two, and the spiderdemon guards episode three (left)

Ridge Racer

Format: Coin-op

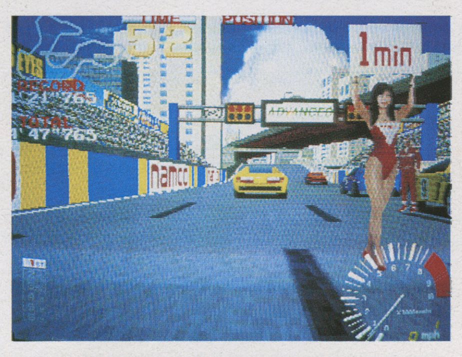
Manufacturer: Namco

Developer: In-house

Price: £8,000 – £25,000

Size: N/a

Release: Out now



Remember the blocky pit crew in *Virtua Racing*? Texture-mapping makes all the difference

State of the art racing games are definitely the flavour of the moment in the arcades. With the *Ridge Racer* coin-op now a major attraction throughout the country, it seems only appropriate to follow up last month's prescreen with a more in-depth appraisal of what is arguably the best-looking videogame yet created, and the one most qualified to give people a taste of the future.

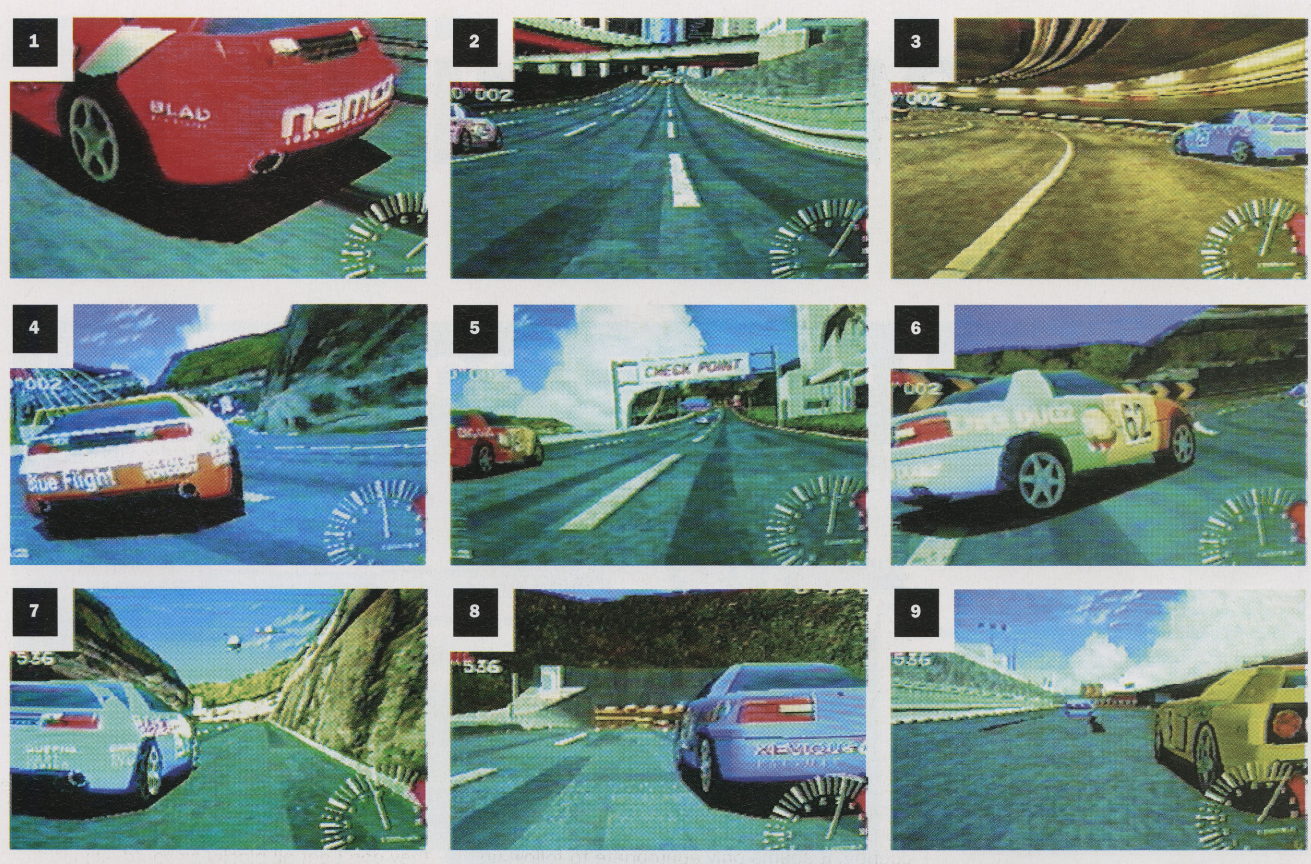
After stealing the show at the 50th Amusement Trade Exhibition International (ATEI) in London, *Ridge Racer*'s success seems assured, especially if some machines' takings of £1500 per weekend are anything to go by. But some people still have their doubts. Is Namco's new baby the game to give the unswerving *Virtua Racing* a run for its money?

Well, if it's graphics we're talking about, there's no competition. While *Virtua Racing* oozes class and, of course, has those incredible camera angles, the sheer quality of *Ridge Racer*'s texture-mapped images has the contest sewn up: 400 million floating-point operations per second, if anyone is interested in the maths involved, and enough polygons generated at 60fps to give a Silicon Graphics rep a heart attack.

But the most impressive thing about *Ridge Racer* is the thoroughly realistic way the cars look and handle. When you approach them they don't get all blocky as you'd expect them to: they shine like real cars, lean around corners like real cars, and are packed with detail and sculpted with loving curves. If it



Static intro screens, perhaps? No, *Ridge Racer* isn't that frivolous. To witness the best ever Gouraud-shaded and texture-mapped realtime polygons, step right up



Here's a guided tour of *Ridge Racer*'s one and only course: 1 Checking out the competition with the help of Namco's autocam. 2 And we're off! Time to step on the gas. 3 Into the first tunnel. 4 Back in the daylight again, and a bridge looms in the distance. 5 The first checkpoint. 6 Sometimes the other drivers do their best to cut you up. 7 Not far to go now: the second and final tunnel lies just around the next bend. 8 Make sure this Mitsubishi-looking thing doesn't try anything clever. 9 The finish line is in sight, and there's only a Ferrari F40 in your way. Go for it!



The bridge is narrow, but there's just enough room to pass this lone Ferrari F40. You hope

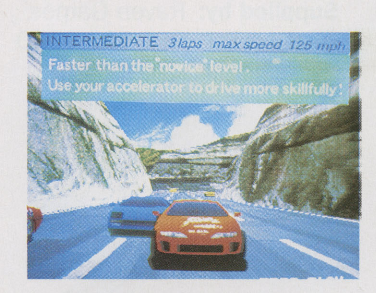
weren't for the sheer pace of the thing, you could quite happily just drive along and admire the cars in front of you.

And that's the main difference between *Ridge Racer* and *Virtua Racing*. While every attempt has been made to make *Ridge Racer* a competitive racing game, it's also very much the coin-op equivalent of taking the car out for a leisurely spin on a Sunday morning.

But that's not to say it's dull. Far from it. Those texture-mapped mountain roads and gleaming, sundrenched skyscrapers are much more attractive then a rainy trip to the paper shop, and under the surface lurks a fast and compulsive racer. However, the inclusion of only one main track also rather scuppers the game's longterm appeal as an *Out Run*-style discovery trip.

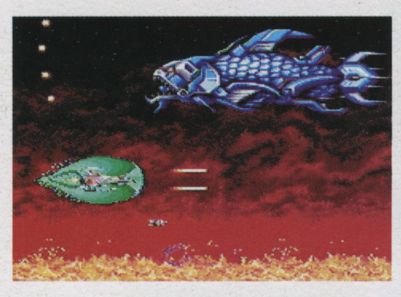
When it comes down to it, the lack of a link-up facility and limited amount of tracks keeps *Ridge Racer* tucked away in the slipstream of Sega's unassailable classic. But if *Virtua Racing* remains champion on the racetrack (until *Daytona*, that is), *Ridge Racer* is king of the open road.

Edge rating: **Eight** out of **ten**



A hood-hugging demo in reverse, courtesy of the intro sequence

Super Darius II



Level one manages to include the coin-op's impressively swirly background

Format:	PC Engine Super CD
Publisher:	NEC Avenue
Developer:	In-house/ A-Wave
Price:	Call (import)
Size:	1 CD
Release:	Out now (Japan)
Supplied by:	Raven Games
Tel:	081-663 6810



Revenge Shark – a massive scrolling fortress complete with independent craft

The battleship Yamoto includes a crab-like section that rips itself from the main hull

It's been over three years since the original *Super Darius* – a conversion of the first *Darius* coin-op – made its appearance on the old PC Engine. In some quarters this game was regarded as one of the best shoot 'em ups on the machine, and there's no doubt that, given the restrictions of the PC Engine's first CD-ROM system, it was a very impressive piece of programming: cramming an entire coin-op, level by level, into the Engine's tiny 64k interface can't have been easy.

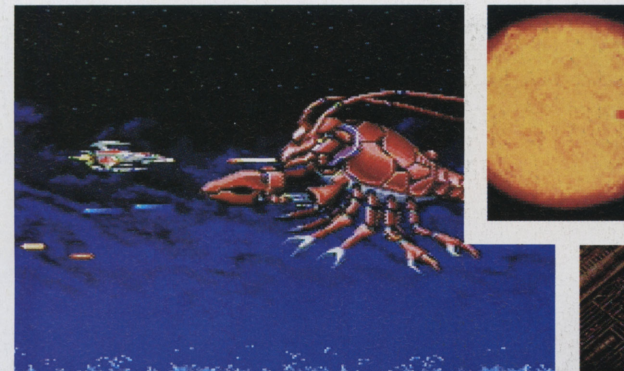
The hugely delayed sequel, which is also known as *Sagaia* in coin-op form, hasn't been restrained by such archaic limitations. And it shows. The speed at which the front end loads (about five seconds) and the increased detail in the backdrops easily outstrip the horribly weedy Mega Drive version. At the outset, *Super Darius II* looks like being the latest in a long line of slick shoot 'em ups for the PC Engine.



Little Stripe, one of the more attractive mid-level bosses

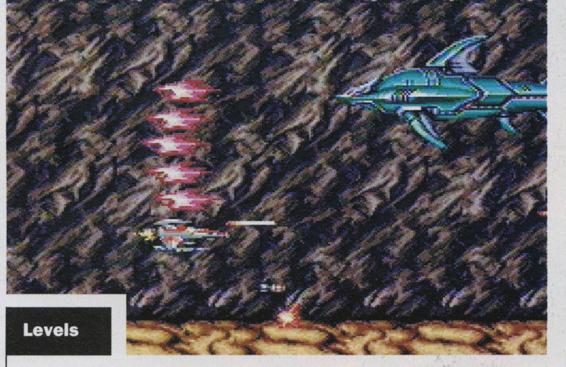
If only the same could be said after half an hour's play. It's a great shame but, possibly in response to the complaints about the first game being too tough, NEC Avenue have made *Super Darius II* far too easy. The bosses are horribly straightforward to defeat if you select the 'easy' mode in the configuration menu and bump up the number of lives and continues. You've got a maximum of nine continues and nine lives per game, and it doesn't take a genius to work out that there are therefore 81 lives to rely on – more than adequate to get you through the entire game about three times over.

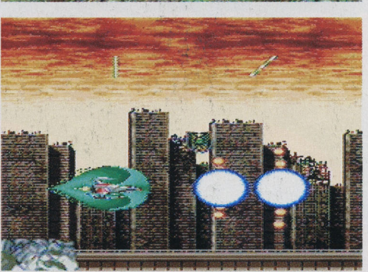
So it's at this point that prospective players face something of a dilemma. If you're as tough as nails and can resist the





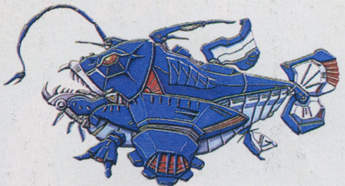






An atlas of **Darius**

As if it's trying to be an underwater, shooting version of *Out Run*, *Super Darius II* includes a level select map allowing a variety of routes to be taken throughout the game. 28 levels might sound like a lot, but the repetition in the graphics is awfully apparent, and you'll definitely want to go through it more than once.



The oddly named Alloy Lantern is one of *Darius II*'s original bosses

Levels

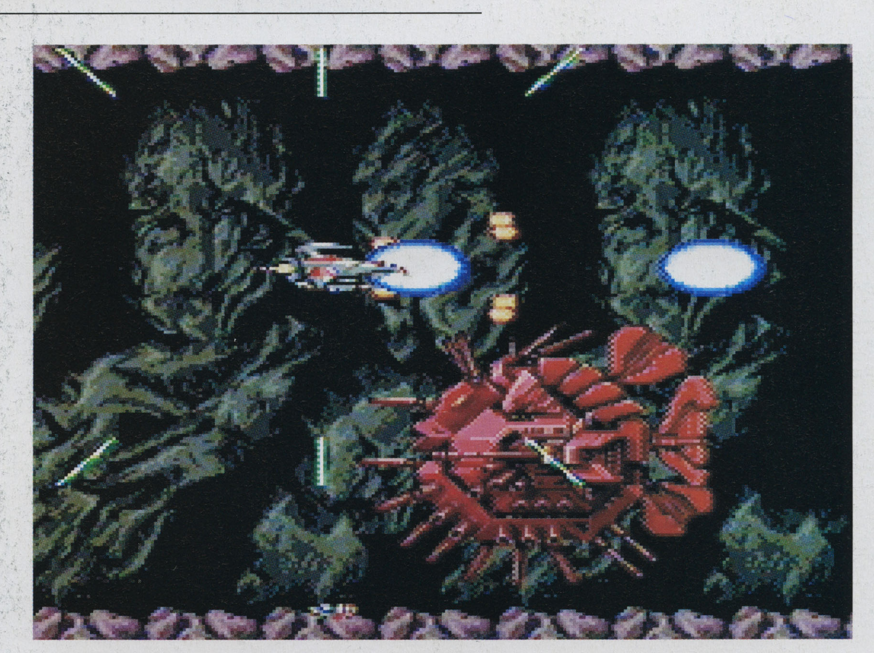
What *Darius* just about gets away with are the unusual boss characters, but it's a shame that they're all so easy to defeat. The lobster boss (top left) has been brought over intact from the *Darius II* coin-op, whereas the green sea-bed creature (top right) is an original creation. And you can tell

temptation of selecting the easy modes, then *Super Darius II* might be worthy of your consideration, especially if you're a devotee of these games. If like most of us, however, you're easily swayed by the existence of selectable difficulty modes and just can't resist choosing the easiest one, then it's likely to be a dubious challenge.

In its favour, there are a whopping 28 levels with multiple routes, and the music is good in places – always one of *Darius*' strong points. But unfortunately, things are let down by the truly appalling sound effects and some less than inspiring new boss characters – the first *Super Darius* game on the Engine included the bosses from the *Darius II* coin-op as a bonus, so new graphics have been added to this version to save repetition.

The original *Darius*' unusual three-screen coin-op format made it interesting, but the sequel took a more conventional course. And that's the problem here. Stripped of the extra screen (the arcade version of *Darius II* only had two screens), and with all the difficulty drawbacks already mentioned, *Super Darius II* is reduced to a fairly ordinary blast. And on the Engine, which already has a large back catalogue of esteemed shoot 'em ups, there's no shortage of serious competition to consider first.

Edge rating: **Six** out of **ten**



The biggest criticism of the original *Super Darius* was the lack of decent power-ups. That's certainly been corrected in this sequel – so much so that it makes things rather easy

PREPARE TO MEET THY

DOOM

Super Puyo Puyo

Format:	SNES
Publisher:	Banpresto
Developer:	Compile
Price:	£50 (import)
Size:	8 meg
Release:	Out now (Jap)



***Puyo Puyo* isn't quite the blatant *Tetris* rip-off that initial impressions suggest. In fact, it shares more similarities with Sega's *Columns*, with success dependent to a large extent on luck**

Alexey Pajitnov has an awful lot to answer for. The Russian inventor of *Tetris* surely can't have imagined that his puzzle game would become one of the most played games of all time (mostly due to Nintendo and its Game Boy). Put simply, *Tetris* is a drug – the very pillar of life for some unfortunate people.

Puyo Puyo is a *Tetris* clone that was released on the Mega Drive back in December 1992. It was designed by Compile, who are more famous for their shoot 'em ups than puzzle games. After staying at the top of the Japanese Mega Drive charts for about six months (it cost a good £20 less than most Mega Drive titles), Sega changed the name and incorporated it into the *Sonic* family as *Robotnik's Mean Bean Machine*. A dodgy name, admittedly, but, with *Sonic*-mania in full flood, one that had more chance of selling.

Unlike *Tetris*, in *Puyo Puyo* (the 'Super' is the usual token addition) you control falling pairs of coloured blobs. By rotating them it's possible to link up groups of the same colour; if four or more cling together they disappear, letting whatever was resting on top of them fall down into new slots. In some ways it's even more simple than the Russian classic.

As you'd probably expect, *Puyo Puyo* scores most points in twoplayer mode. When a player manages to drop several group of blobs, a counter-shower of clear blobs rains down on the other player, thwarting any blob-dropping plans they might have had. This still happens in the oneplayer mode, but naturally, things don't ever get quite so enjoyable. It's a fact of gaming life – two players will always have more fun than one.

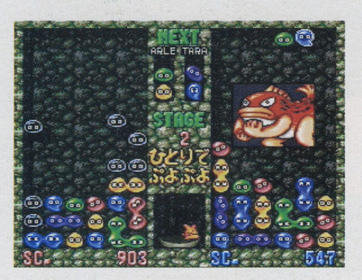
And now we come to the ethics bit. It's rather difficult to determine the value of a game like *Puyo Puyo*, when there are a million *Tetris* clones already out there, and when this sort of thing fits so cosily into the shareware or public domain category that the Amiga and PC enjoy. If you consider that for less dosh than *Puyo Puyo* costs you could pick up a Game Boy *and* a copy of Tetris...

Edge rating: **Seven** out of **ten**



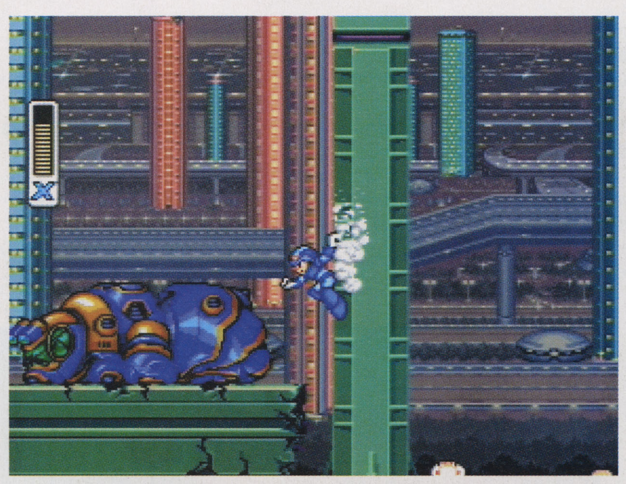




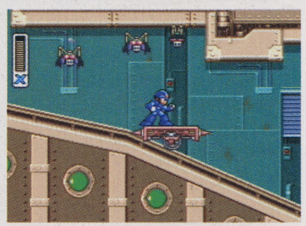


(From top) The blobs start lining up nicely, with the four purple ones joining up and disappearing. Those clear ones are harder to shift, though

Mega Man X





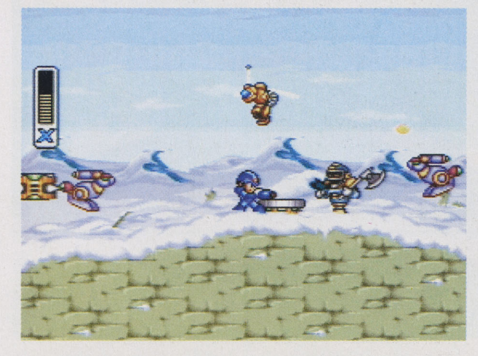


Mega Man has to slide down girders (above) and ride on mine carts (bottom right) to finish some levels, as well as avoid bosses like this axe-wielding robot (top right), eager to carve up our hero

Format:	SNES
Publisher:	Capcom
Developer:	In-house
Price:	£60
Size:	12Mbit
Release:	Out now (Jap/US)

Aside from Mario, Mega Man – or Rockman, as he's known in Japan – is Nintendo's most successful character. In a career stretching some eight years, he's starred in six NES titles and four Game Boy ones. And now, inevitably, Mega Man makes his 16bit debut, in *Mega Man X* on the SNES.

True *Mega Man* veterans will grin inanely the moment their hero materialises onscreen: the familiar blue uniform, the innocent wide-eyed expression, the cannon-wielding arm – it's all here. The game structure is very similar to that of the previous games, too: Mega Man has to climb, leap, and battle his way through eight multidirectional scrolling levels, collecting power-ups as he goes.



Mega Man braves the arctic conditions, only to find himself surrounded by his enemies

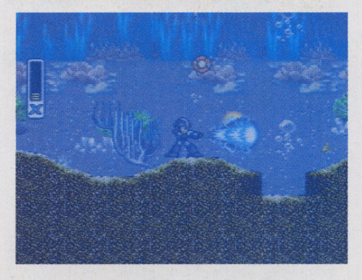
Considering it's on the SNES, graphically *Mega Man X* isn't particularly inspiring. The parallax levels work well enough and the sprites are quite well drawn, but there's nothing here you haven't seen before. The same goes for the music: the tunes are bland and do little to add atmosphere to the game.

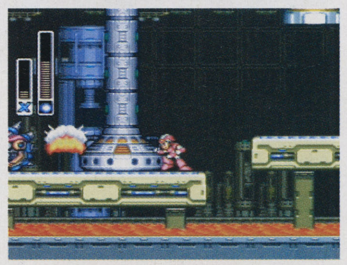
So to the untrained eye *Mega Man X* seems no more than a bundle of mediocrity. But lurking beneath this rather unassuming exterior lies a solid and playable platform shoot 'em up. Historically, the *Mega Man* games have always relied on the way they played rather than great aesthetics, and the same goes for this one. The Mega Man character is very responsive to your commands, and although the eight levels are quite small, getting through them all will take some doing. (Thankfully, Capcom have added a password feature, should anyone need it.)

It's just a shame that the Capcom programmers didn't use the SNES to the full extent of its capabilities. They could have made so much more of *Mega Man X* if they'd included rotating Mode 7 visuals, great orchestral soundtracks, bigger and harder bosses, more levels... Still, it plays well enough, and that's what matters. Don't expect anything radically new and you won't be too disappointed.

Edge rating: **Seven** out of **ten**







Use this screen (top) to decide where to go next. Avoid the sea horses in the underwater section (middle). Mega Man just manages to avoid getting crushed (bottom)

Scavenger 4

Format:	FM Towns Marty
Publisher:	Fujitsu
Developer:	Psygnosis
Price:	£100 (import)
Size:	1 CD
Release date:	Out now (Jap)
Planned for:	Mega CD PC CD-ROM
Supplied by:	Raven Games 081-663 6810

Psygnosis didn't make many friends with the much-hyped *Microcosm*. It received a universal thumbs-down, and few people expected the company's next digital video effort to be any better. *Scavenger 4*, however, goes some way towards redressing the balance.

In its barest form, *Scavenger 4* is a straightforward, no-punches-pulled shoot 'em up. You progress through the levels, take out the intermediate and end-of-level bosses... and so on, and so forth. The gameplay isn't particularly new or inventive, and, certainly when viewed in isolation, the action isn't that spectacular.

But what was so desperately lacking in *Microcosm* – chiefly, rewarding gameplay – has been subtly integrated into *Scavenger 4*. Even after a few goes you'll be impressed by what the programmers have managed to achieve.

The main focus of admiration is the digital video backgrounds that play from the CD. It's here that gameplay meets clever programming, to good effect. Usually in games like these, video backgrounds turn out to be more of a distraction than a blessing. In *Scavenger 4,* though, they work surprisingly well. Not perfectly, it has to be said – your sprite still looks about as much a part of the game as a fly clinging to the TV screen – but







When you're flying between planets, the CD plays these stunning animations, with swooping, panning scenes that look utterly marvellous



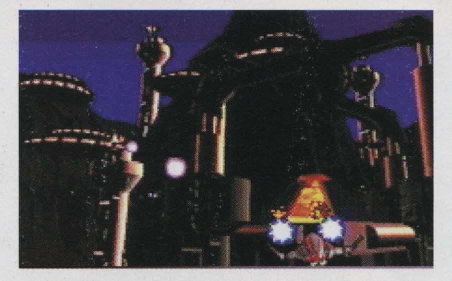
There's no doubt that in *Scavenger 4*, Psygnosis have created their best ever backgrounds. The fact that they're fully Z-buffered, allowing comprehensive collision detection, makes them even more impressive



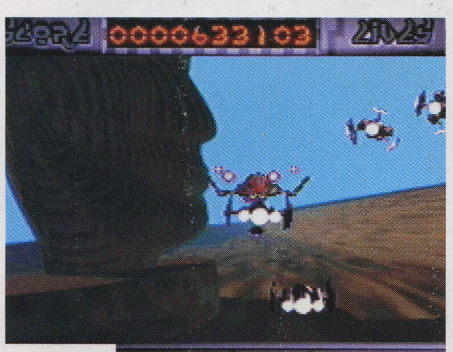
Krina

Swooping past this cliff on the second section of Krina is an exhilarating experience





Alias' *Dynamic OptiF/X* library created these excellent fiery effects (top right). Now it's time to put this boss (above) out of action



Egonia



Egonia includes a low-level flight over the planet's surface (top). You're then chucked underground to face this hideous crab boss



These trench scenes might look similar to the ones in *Rebel Assault*, but they're much more detailed

the integration of the backgrounds with the game environment is handled remarkably well, with fully Z-buffered landscapes and bosses which allow collision detection with everything in the game.

Fly too low, for example, and you scrape the hull of your ship against the valley floor, resulting in a shower of sparks. And if you swerve too close to the walls of the mountains, there's the danger that your wing tips will make contact, with unpredictable consequences. When shooting the highly animated bosses, your bullets travel into the screen to exactly the correct depth – depending on what they connect with.

The sound effects also help accentuate the effect of the collision detection. And the ability to configure them so they play louder than the music (which, frankly, drones away like a cheapo keyboard at a DIY garage rave) lets you tell when your bullets are connecting properly, which is very useful.

Of course, there's still no escaping the fact that you can't fly wherever you want. But then, could you fly where you wanted in *R-Type*? Or *Galaxian^3*? No, and this game isn't trying to be any different. It's still got the same degree of interaction as any two-dimensional shoot 'em up; it's just that the scenery's a whole lot prettier. In fact, these are easily some of the most stunning animated graphics yet streamed off a CD. The 256-colour images were

Alias animation

Psygnosis are pioneers in the field of rendered graphics, and *Scavenger 4* is their most accomplished effort yet.

The landscapes and sprites were fully modelled and rendered using Alias' *PowerAnimator V4.0* on Silicon Graphics Indigos. And the collision detection? Well, most SG software packages contain the facility to calculate Z (or depth) values over a 3D model or landscape. These are checked against the position of your sprite and its bullets, and collision results whenever appropriate.

When you consider that there are around 60,000 frames of animation in *Scavenger 4*, taking up around 500Mb, you get some idea of the modelling and rendering power of SG machines coupled with something like Alias' *PowerAnimator*. Especially when the project was designed and completed in just five months.

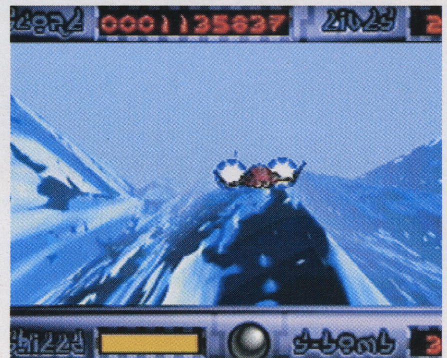
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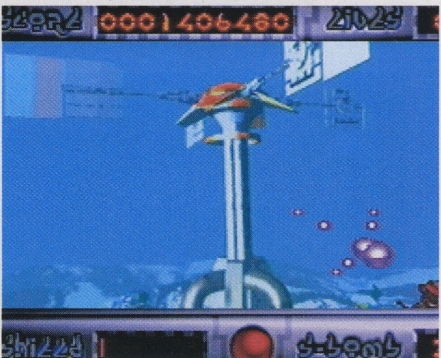


Kri-nor

Just when you think the game can't get any lovelier, along comes the ice level







Flying down these crevices without hitting the sharply jutting rocks isn't easy (left). Looking like a futuristic Ice Station Zebra, Kri-nor's weather vane (right) is one of your first adversaries on the planet

The *Scavenger 4* team

The people responsible for *Scavenger 4* are: (standing, from left to right) Rob Smith (programmer), Mark Hula (programmer), Chris Nicholls (musician), Jerry Oldrieve (artist), G P 'Kenny' Everett (project manager/programmer), Oliver Wright (programmer), Paul Franklin (lead artist), Zafar Qamar (programmer), Chris Browne (artist), Colin Dempsey (artist), Rogan MacDonald (artist), (seated, front) Nick Burcombe (gameplay director).

Continued

rendered using Alias' *PowerAnimator*, and the results speak for themselves. It's certainly an impressive achievement for a mere five months' work.

So, *Scavenger 4* clears the integrated-backdrop hurdle with flying colours. But, leaving aside the pretty graphics for a moment, how does it rate as a shoot 'em up? Fairly well, actually. With no continues, and restart points that aren't too frustrating, it does indeed succeed as an addictive little blast. But there's no denying that it would have benefited from a little more meat on its bones – some fabulous power-ups or amazing ingame sprites to take your mind off the backdrops occasionally.

Still, compliments are in order for Psygnosis. In terms of both graphics and gameplay, *Scavenger 4* has LucasArts' *Rebel Assault* well and truly licked. Who would have thought that there would be life after *Microcosm*? Now, if only we had a fullscreen, 24bit colour CD-i version...

Edge rating: **Seven** out of **ten**

Lunar The Silver Star



Alex – yes, he's the hero – with his strange winged pet. The characters are beautifully illustrated...

... So it's a pity the surrounding graphics, such as the main map, look uncomfortably like C64 graphics

Format:	Mega CD
Publisher:	Working Designs
Developer:	Game Arts
Price:	£45 (import)
Size:	1 CD
Release:	Out now (US)
Supplied by:	Dream Machines (0429) 869459

Although far from perfect, *Lunar* is a welcome departure for the Mega CD – it's a CD game that actually justifies itself. And for once, it manages it without resorting to a single clip of video, thus sparing us the embarrassment of watching unknown actors hamming it up in 'fuzz-o-vision'.

Lunar was released in Japan way back in 1992, and was created by talented *Silpheed* designers Game Arts, with the help of a top Japanese designer and a professional studio.

What makes the US version so appealing is the striking animation and character design that's been retained by California-based Working Designs – a company dedicated to translating Japanese games for the US market. From the packaging to the introductory song and ingame speech, the feel of the game never detracts from what the original Japanese creators intended. And amazingly, there are four megabytes of translated text in there too.

But what looks great on the surface often pales once uncloaked. Compared to the beautiful cut scenes and professional speech, the crude backdrops and tiny sprites do little to fire the imagination – not to mention the helplessly ambient CD soundtracks.

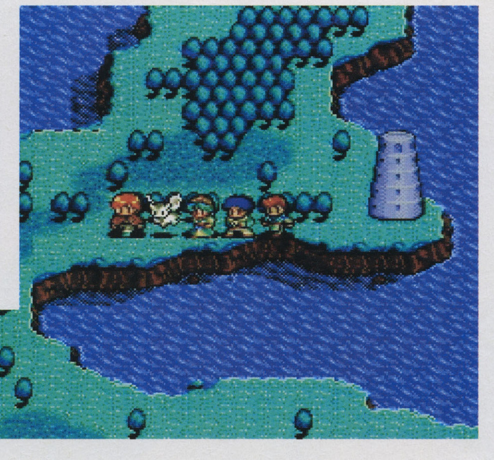
Sadly, the gameplay suffers too. *Lunar* fits cosily into the old school of Japanese roleplaying where combat is completely random. As soon as you leave a village, it's pure luck whether you get attacked or not, and sometimes there can be several battles in the space of a few paces. Fans of Japanese RPGs will be no strangers to a linear game structure either, but it's far more noticeable here.

Lunar's trimmings make good use of the Mega CD, but as a game it falls short of the likes of *Landstalker* and *Secret Of Mana*. A step in the right direction, certainly, but not without a few glaring flaws.

Edge rating: **Six** out of **ten**



You can't escape the flaws in *Lunar* – battle scenes (above) are a real pain for most of the game. Compared to a sophisticated realtime combat mode like that in *Secret Of Mana*, this is repetitive

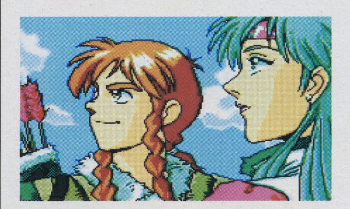


Outside









Cut scenes appear whenever you meet up with people. Observant anime fans familiar with the *Secret Of Blue Water* and *Gunbuster* series might notice that this is the work of the same famous designer



SimCity 2000

Format: PC/Mac
Publisher: Maxis
Developer: In-house
Price: £40
Size: 2 disks
Release: Out now

SimCity is an old fave of the PC gaming crowd. But the strange thing about it is that no-one quite understands why everyone likes it so much. It's the kind of game that you can safely take home and introduce to your mum, but that can still engross even the most hardcore gamer for hours at a stretch.

Above all, *SimCity* is simple, it's very, very popular, and now in its latest incarnation it's also got something rather special in the graphics department. *SimCity* developers Maxis have added a proper isometric 3D view to the game – and as you can see from these screenshots, it really does help bring your Sim cityscapes to life.

The 3D table-top view can be spun through 180 degrees in both directions to let you see your city from every angle, and there are also several other important new features – like a built-in terrain editor, 32 layers of altitude, and an underground section for water pipes and a subway system. Opening *SimCity* up into the third dimension has made the game more complex – you have to keep checking your underground water pipes, for example – but it's also made the onscreen happenings that much more engrossing.

In the higher resolutions, the graphical detail of every building and object in your city is astonishing. From the tiny planes that jet across the screen (leaving their shadow on the ground below), to the trains pulling out of your stations and the ships and boats moored in the marinas or sailing across the harbour, *SimCity 2000* is a stunning product.

The beautifully drawn buildings and objects in the game take up over 2 meg of hard disk space, and the speed at which the game engine shifts all this around onscreen is simply amazing. Still, all this impressive graphic detail means that this is probably a game that's more suited to 486 or 68040 specced machines.

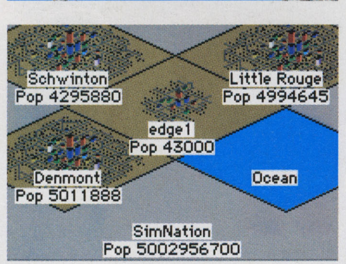
Playing any of the Sim games has always been a peculiarly addictive and rewarding experience, but this new version takes *SimCity* further than anyone ever thought it could go. For its graphics alone, *SimCity 2000* is an essential purchase.

Edge rating: **Eight** out of **Ten**

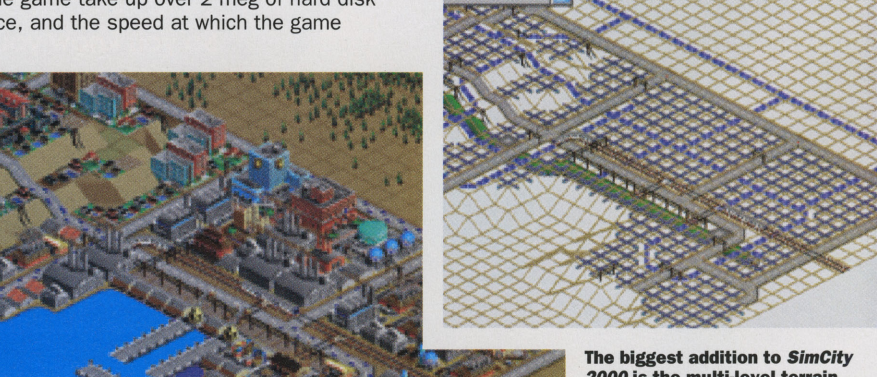


One of the four Sim scenarios: Dullsville (left) needs livening up – but keep to your budget...





Some of the detailed buildings from a better-developed SimCity (top); A monster goes on the rampage in downtown Hollywood (middle); The screen for comparing the sizes of neighbouring rival cities (bottom)

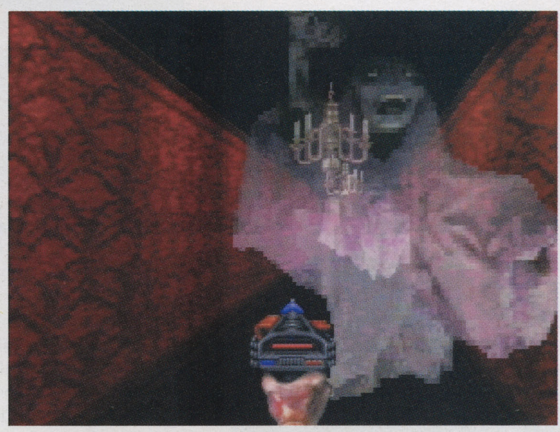


The biggest addition to *SimCity 2000* is the multi-level terrain. This industrial harbour (left) has a complete network of water pipes (blue lines), a subway (green tube) and an overground rail system (brown)

Escape From Monster Manor



Format:	3DO
Publisher:	EA
Developer:	Studio 3DO
Price:	£55
Size:	1 CD
Release:	Out now (US)
Supplier:	Zap Games 0532 590077



The end-of-level boss on the first floor: the animation of the figures is by far the game's best feature. Later ghosts are even properly transparent (right)

Abandon hope all ye who enter here, warns the player's guide to the latest 3DO release, *Escape From Monster Manor*. And yes, as you've probably spotted, there's rich irony here: by now 3DO owners probably have just about abandoned hope of ever seeing a decent game on their system.

And sadly *Monster Manor* – in spite of a few nice and very detailed baddies – is not a game that anyone's going to rush out and buy a 3DO for. It took a team of no less than 25 people to produce this game, which although okay in places, looks too unfinished and too drab to make any kind of name for itself.

First there's the obvious *Wolfenstein* comparisons: *Monster Manor* does pretty much everything *Wolfenstein 3D* on the PC did, and it moves just about as swiftly. But then the massive wonders of the sequel, *Doom*, have since totally overshadowed *Wolfenstein*. And the comparison with *Doom* is infinitely worse: *Monster Manor* has none of the multiple play levels, the labyrinthine secret passages, and the amazing parallax scrolling. In fact, *Monster Manor* doesn't even have the multiple weapons (ie machine and chain guns) of the basic *Wolfenstein*.

It's the 'look and feel' factor that's *Monster Manor*'s biggest asset. The dark corridors, the offscreen shrieking, the hanging spiders, the snaggle-toothed old crones that chase you about – this is definitely a scary battleground for a 3D encounter. But the gameplay lets it all down. The scythe-wielding ghouls that you face early on are no real challenge, killing the spiders is just a nuisance, and the ammunition and health power-ups seem too plentiful.

But the biggest failing is that most of the screens are too empty of things for you to interact with. And the occasional 3D gems and coins that you pick up seem to have almost no effect on the game – they're just money in the bank. Still, that's something that's probably a pretty unfamiliar concept to the 3DO Company right now.

Edge rating: **Five** out of **Ten**

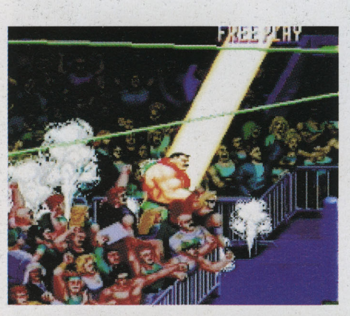




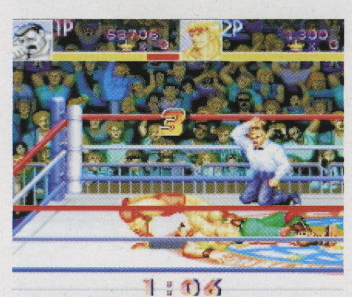
The ghouls that lurk in the first level (top) are easily zapped. But later levels contain spooks and spiders – frequent bringers of death (bottom)

Muscle Bomber

Format:	FM Towns Marty
Publisher:	Capcom
Developer:	In-house
Price:	Call (import)
Size:	1 CD
Release:	Out now (Jap)
Supplied by:	Console Concepts
Tel:	0782 712759







Haggar (top) strides confidently towards the ring. Sheep tees off with a drop kick (middle). Before long, both men lie exhausted on the canvas (bottom)





Budo attempts to powerslam the mighty Haggar (above), as Gomes (top, right and above right) demonstrates his immense power on poor old Colt

If you fancy wearing a pair of tights, adopting a preposterous persona and wrestling with other equally ludicrous 'characters', yet somehow can't seem to find the right time and place, this surprise release from Capcom could be just the thing. Licensed from the American Wrestling Federation, the WWF's poor relation, *Muscle Bomber* is a fairly simple ring-bound beat 'em up. Choose from one of the wrestlers on offer, each one a different nationality, and grapple your way around the world using the – frankly limited – number of moves on offer.

To be honest, *Muscle Bomber* doesn't deliver the degree of flexibility that games like *Street Fighter II* have led us to expect. The moves, although reasonably effective, soon become boring. Attacks basically fall into two categories: the straightforward slap/kick, and the grapple, which offers some scope for improvisation. Once you've grabbed your opponent, tapping the button again while moving the joypad in a given direction triggers the various piledrivers and body slams. Push away, for instance, and you'll send your opponent hurtling into the ropes, only to bounce back into your fist or 25-hole boot. Alternatively, push up for a body slam or pile driver or execute what might be called a back-flip slam, but probably isn't.



You'll need two joypads (and a Marty) to get the best out of *Muscle Bomber*

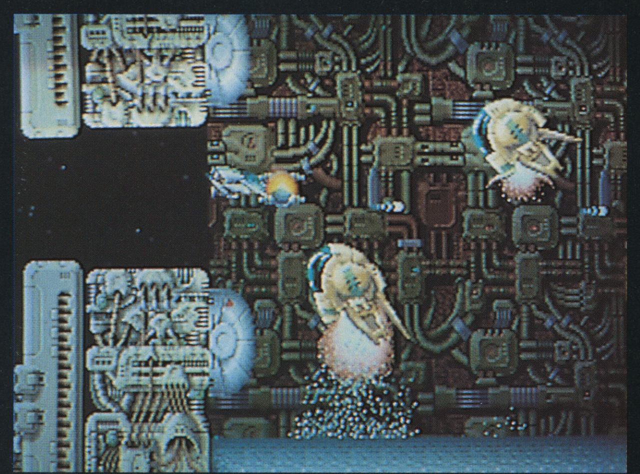
Anyway, once you've inflicted enough of this sort of unnecessary violence on your hapless adversary, he'll unsurprisingly fall over for a bit of a rest. At this point you might like to stamp on his head a few times or lie on top of him for a knockout.

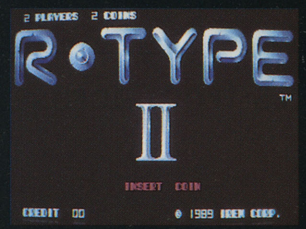
And so forth. *Muscle Bomber* looks smart, plays well and the QSound is great. But this is nothing more than a faithful conversion of the *Slam Masters* coin-op. Now, if *Eco Fighters* or *Dungeons & Dragons: Tower Of Doom* were to be converted...

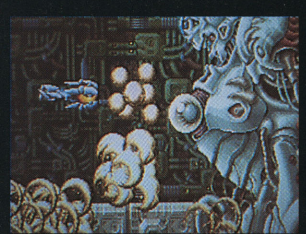
Edge rating: **Five** out of **ten**

With the Super Gun, the golden coin-ops of yesteryear can be played in your own home. **Edge** reflects on a classic blast from the past

R-Type II





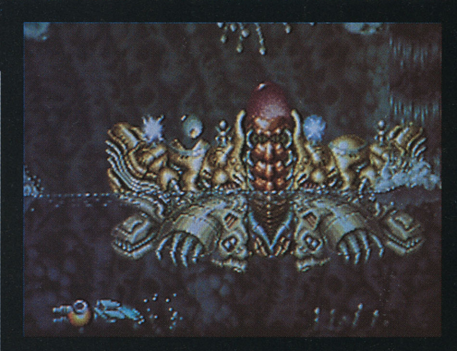


Like the original game, *R-Type II*'s first level is set in a space station (above), and here's the first boss (right)

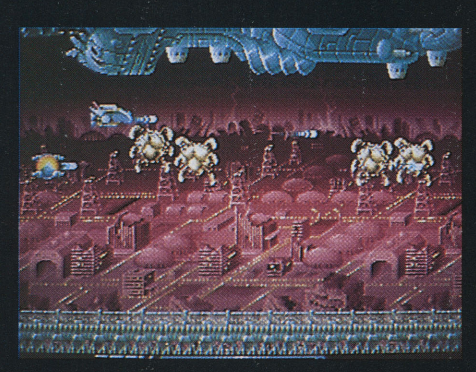
Format:	PCB
Publisher:	Irem
Players:	One
Price:	£50 – £100 (originally £700)
Released:	Late 1989
Supplied by:	Raven Games
Tel:	081-663 6810

It's strange playing a game four years on and finding it even more enjoyable than the first time. It probably says just as much about the quality of today's gameplay as it does about classic game design.

The first *R-Type* was a revolutionary game. Not only did it produce some of the most exquisite graphics of the late '80s, but it offered shoot 'em up fans the most challenging gameplay they'd ever seen. It was perfect in so many ways. So it was unusual – and almost unethical in Japanese terms – that a sequel would take over three years to appear. But it did, and then failed to make an impact. *R-Type* fever was dead, and the game drifted off into coin-op oblivion.



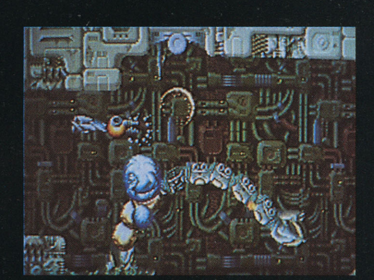
Dropped from the SNES version, this second-level boss is a brilliantly designed opponent

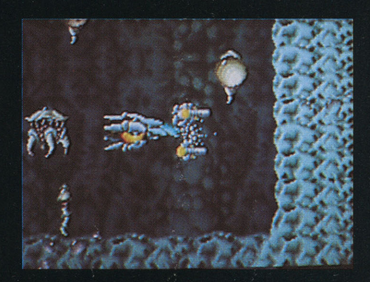


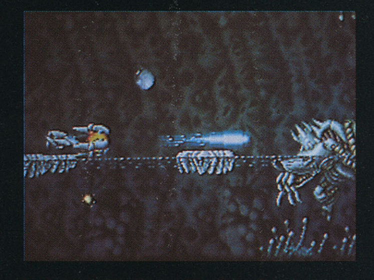
Level three has an onslaught of huge boss ships (above) but the end guy is really something else

In many ways, *R-Type II* is as tough and addictive as the original coin-op. There are only six levels this time as opposed to eight, and the last level is a slightly disappointing finale, but it still has all the skilful nose-cone switching and the same rigid game structure. Continues don't allow you to sail past the tough bits like in most coin-ops; if you die in *R-Type II* you have to go back and try again, until you've perfected your technique. And perfecting that technique is hugely addictive.

While hardly a noticeable improvement over the original, *R-Type II* is still an immensely enjoyable game, supported by vibrant sound and beautifully drawn graphics. Unlike the pitifully jerky SNES conversion and its recent follow-up, this is everything a shoot 'em up should be. Super Gun owners should hunt it down before it gets lost forever. E







Level one has enough to keep you occupied (top), but the water level (middle and above) is where things really take off, putting the SNES version to shame in every respect

Liberation CD32 **Mario All Stars** SNES **Sonic CD** Mega CD **Fire Emblem** Super Famicom (Japan) **Fantasy Star IV** MD (Japan) **Rebel Assault** PC CD-ROM **Ridge Racer** (most wanted)



The very latest **charts** from across the entire world of videogaming

Amiga CD32

1 **Liberation**
***Mindscape* (£35)**

2 Labyrinth Of Time *EA* (£25)

3 Sensible Soccer
Renegade/Mindscape (£25)

4 Nigel Mansell
Gremlin Graphics (£30)

5 Pinball Fantasies
21st Century Ent. (£33)

6 Arabian Nights
Buzz (£15)

7 Whale's Voyage
Micro Value (£30)

8 Deep Core *ICE Ltd* (£26)

9 Alfred Chicken
Mindscape (£26)

10 Zool *Gremlin Graphics* (£30)



Many believe that Mindscape's *Liberation* is the first game to take full advantage of the CD format. As a result, it's gone straight to the top of the CD32 chart and looks like it could well stay there for some time. Look for Acid Software's *Guardian* to make an impact over the next few months – if they can ever decide what to call the thing...

SFC (Japan)

1 **Fire Emblem**
Nintendo ¥9800

2 Dragon Ball Z 2
Bandai ¥ 09800

3 Rockman X *Capcom ¥9500*

4 Super Tetris 2
Bullet Proof ¥8500

5 Rainbow Bell Adventure
Konami ¥9000

6 Ganbare Goemon 2
Konami ¥ 9800

7 Sailor Moon R
Angel ¥9800

8 Super Fire Pro Wrestling 3
Human ¥9700

9 Legend Of Haou *Koei ¥ 12800*

10 Romancing Saga 2
Square ¥9900



It's hard to believe that the Japanese didn't take to *Ganbare Goemon 2* the way we have over here. *Goemon 2* is a wonderful mixture of game genres, with brilliant presentation and near perfect playability. What more can they possibly want?

PC CD-ROM

1 **Rebel Assault**
***US Gold* (£46)**

2 Day Of The Tentacle
US Gold (£46)

3 Return To Zork
Activision (£50)

4 The Lord Of The Rings
Interplay (£45)

5 Dracula Unleashed
Mindscape (£50)

6 The 7th Guest *Virgin* (£70)

7 The Journeyman Project
Gametek (£40)

8 Indiana Jones, Fate Of
Atlantis *US Gold* (£45)

9 Tornado
Digital Integration (£45)

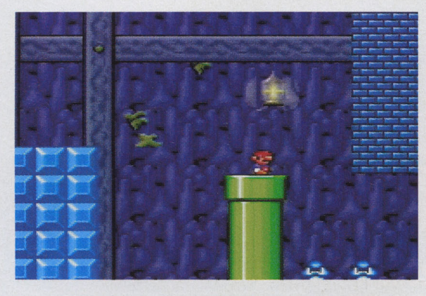
10 Dune *Virgin* (£50)



US Gold have certainly hit the hot spot as far as PC owners are concerned. Their cinematic *Rebel Assault* hogs the number one position for yet another month. It seems as if PC owners have found the lure of interactive CD software just too much of a temptation

Super NES

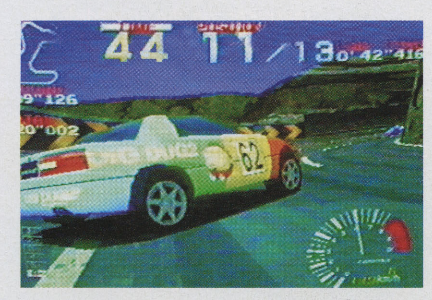
1. **Mario All Stars *Nintendo* (£50)**
2. Jurassic Park *Ocean* (£55)
3. Aladdin Capcom (£50)
4. Street Fighter II Turbo *Capcom* (£60)
5. Super Mario Kart *Nintendo* (£40)
6. Flashback *Sony Imagesoft* (£50)
7. Nigel Mansell *Nintendo* (£40)
8. Super Bomberman *Hudson Soft* (£45)
9. Mortal Kombat *Acclaim* (£60)
10. Cool Spot *Virgin* (£45)



For the third month in succession, Nintendo's *Mario All Stars* manages to hold the number one spot. And the sad thing is, there doesn't seem to be that much around to trouble it at the moment. Maybe *Stunt Race FX* will have something to say about the matter

Most wanted

1. **Ridge Racer: *Sony PS-X***
2. FIFA International Soccer: *3DO*
3. Daytona: *Saturn*
4. Galaxian^4: *Sony PS-X*
5. A Sony PS-X



Things are a bit sparse in the Most Wanted mailbag. If only to fire your imagination, here's Edge's personal, albeit fanciful, Most Wanted list. Post lists to Edge, 30 Monmouth St, Bath, BA1 2BW, or e-mail them to us at future@cix.compulink.co.uk with a subject line of 'EDGE: Most Wanted'

Mega CD

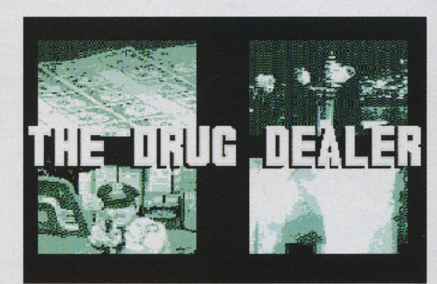
1. **Sonic CD *Sega* (£45)**
2. Thunderhawk *Core* (£45)
3. Silpheed *Game Arts* (£50)
4. Lethal Enforcers *Konami* (£55)
5. Night Trap *Digital Pictures* (£50)
6. Sewer Shark *Sony Imagesoft* (£44)
7. Batman Returns *Konami* (£50)
8. Final Fight *Capcom* (£45)
9. Ecco *Sega* (£45)
10. Sherlock Holmes *Sega* (£45)



The lack of movement in the Mega CD chart comes as no real surprise. Sonic's still holding off *Thunderhawk* for the number one position – but for how long? The other games have just shuffled position. Again

MD (Japan)

1. **Phantasy Star IV *Sega* ¥8800**
2. Shining Force II *Sega* ¥8800
3. Dream House (CD) *Sega* ¥7800
4. Puyo Puyo *Sega* ¥4800
5. Sonic CD *Sega* ¥8800
6. Lethal Enforcers *Konami ¥9400*
7. Lethal Enforcers (CD) *Konami* ¥9800
8. Dragon's Revenge *Tengen ¥7800*
9. Aldark (CD) *Sega* ¥8800
10. Dragon's Fist *Sega ¥8800*

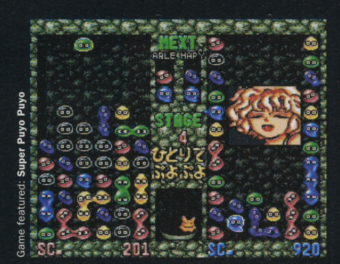


Konami's *Lethal Enforcers* is doing well on both the CD and cartridge chart this month. And amazingly, there's very little difference between the two versions. Both offer the same repetitive shooting action, and both feature hazy, unconvincing sprites. Odd, that



Recommended reading

In which we preview a few of

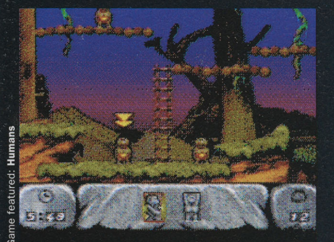

Game featured: Super Puyo Puyo

Magazine: **Super Play**
Format: **SNES**
Price: **£2.50**

You want to know about the CES? Super Play will tell you *everything* about the CES. We also check out the latest coin-ops and decide which ones you'll be buying on SNES when they arrive. Of course, we'll also be telling you exactly which games to buy on the SNES right now: **Super Puyo Puyo** gets a comprehensive look, as does *Pop 'n' Twinbee's Rainbow Bell Adventures*. We check out the latest Japanese roleplaying games, and decide whether *Luffia* has a chance against *Secret Of Mana*. Oh, and we'll tell you how to do all the weirdest and best moves in *Turtles: Tournament Fighters*.

Super Play is Britain's biggest-selling SNES mag and this issue will be onsale March 3. Recommended reading? This is absolutely *essential*.

James Leach, Editor


Game featured: Humans

Magazine: **Game Zone**
Format: **SNES**
Price: **£2.50**

Remember Manga? For a couple of hours on a wet Sunday afternoon last November Japanese anime films were the hottest and hippest items going. That was then, this is now.
The new kid on the trend-setting block is America's own *Speed Racer*, the daring cartoon hero of MTV. '50s kitsch, deliberately underplayed anim's and 'jolly hockey' scripts make *Speed Racer* a little special. Now *Racer X*, *Snake Oiler*, *Captain Terror* and *Speed Racer* himself are all set to début on UK SNESs later this spring.

Is this an instant cult (just add MTV and hype for the best) and has the driver of the legendary *MACH 5* got what it takes to be a SNES sportster? Game Zone takes the first in-depth look at this '90s myth in the making. "Gosh, I hope no one gets hurt."

Humans, *Chaos Engine, Mega Man X, Desert Fighter, Ryan Giggs' Champions, Spectre* all reviewed. *Flashback, Cool Spot, F1 Pole Position, Madden NFL '94, Wolfenstein* and *Mega Lo Mania* all tipped to death.

Trenton Webb, Editor


Game featured: Saurus

Magazine: **PC Format**
Format: **PC**
Price: **£3.95**

With more powerful PCs becoming the norm, 3D games are back. In the March issue of PC Format, we've lined up a colossal feature on the new breed of 3D games. Not only will we be showing you what you'll be playing later this year, but we'll also be taking a look at how a 3D game is put together. We've even stuck the latest version of *Persistence Of Vision*, an incredibly powerful raytracer, on the coverdisk, so you can try to create your own photorealistic 3D graphics.

This month's reviews include Maxis' breathtaking *Sim City 2000*, Sierra's dark and broody *Gabriel Knight* and 21st Century's finger-flippin' *Pinball Fantasies*. Our special coverdisk demo pits an F18 Hornet against a MiG-29 as Mindscape's *Evasive Action* takes to the skies. Then there's a beginner's guide to making music on your PC and an exclusive look at a controversial anti-drugs game. With all that, plus extensive hints and tips, it's easy to see why PC Format has become the world's top-selling PC leisure magazine. March issue on sale February 24.

Dan Slingsby, Editor

the other Future videogame magazines


Game featured: Doom: Evil unleashed

Magazine: **GamesMaster**
Format: **Multiformat**
Price: **£2.25**

GamesMaster isn't an official magazine. Oh no. None of that backslapping stuff with corporate types for us. GamesMaster is cool. This month we explain, in terse, unpatronising language, how great a basketball sim *NBA Jam* (SNES/Mega Drive) is – and how you'd be a fuming great spiral of dog ordure if you failed to purchase it. We also take a look at *Sonic 3* (Mega Drive). It's Sonic! Again! For a third bleedin' time!

Amongst the other good things in this issue: *Pop 'n' Twinbee's Rainbow Bell Adventures* (Jesus. SNES), *Skitchin'* (amusingly irresponsible skate 'em up. Mega Drive), **Doom** (viscera-smothered 3D blast. PC), and *Ryder Cup Golf* (a tender tale of a guy who, by day, drives a school bus, but, by night, fights vampires in a post-apocalyptic war zone. Amiga).

It's out on February 17. It's sickeningly great. And it's cheaper than all the other magazines on these two pages!

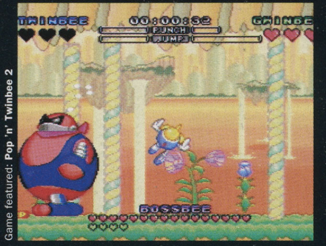
Andy Lowe, Editor


Game featured: NBA Jam

Magazine: **Mega**
Format: **Mega Drive**
Price: **£2.50**

If you like basketball, you're going to love this issue of Mega (on sale February 17), because we've got an extended six-page feature review on the Mega Drive version of the coin-op sensation **NBA Jam**. But if basketball isn't your thing, then you're still going to get a lot out of Mega. We've got a four-page feature on Sega's coin-op technology (and what it means to the Saturn), and all the news from the CES show in Las Vegas. We've also got more reviews than ever, including titles like *Sonic 3*, *Dragon's Lair* and *Jurassic Park CD*. And as if that wasn't enough, we've got a complete solution to *Cosmic Spacehead* and loads more tips besides. Sometimes it just amazes me how we fit it all into 100 pages.

Paul Mellerick, Reviews Editor


Game featured: Pop 'n' Twinbee 2

Magazine: **Total!**
Format: **All Nintendo**
Price: **£2.50**

Unbelievable though it may be, the March issue of Total! has a world SNES exclusive on *Stunt Racer FX*, the hottest game of 1994 – Nintendo's second FX title is exploded in our massive and detailed feature. We tell you how it plays, how it looks and why it pees on *Super Mario Kart* from a great height. We also review *NBA Jam*, the best sports game since *Super Tennis*. The SNES finally gets a decent American footy game in the shape of *Madden '94*. We'll be checking out **Pop 'n' Twinbee 2** – *Rainbow Bell Adventures* too, a *Sonic* lookalike that easily manages to beat its Sega counterpart. We have all this plus a massive Las Vegas CES report in the current issue of Total! On sale February 17. See ya!

Frank O' Connor, Editor


Game featured: Sim City 2000

Magazine: **PC Gamer**
Format: **PC**
Price: **£3.95**

Those intelligent enough to pick up the March issue of PC Gamer will be in for a *Doom*-tastic time, as it contains not only a mammoth three-page review of the PC's hottest ever blaster, but also a full rundown on those elusive cheat codes and a world exclusive interview with the game's creators, Id Software! We also provide the definitive first review of **Sim City 2000**, *Evasive Action*, *Mortal Kombat* and – yes! – many more. Not to mention the usual batch of exclusive scoop previews, a gamer's guide to CD-ROM, invaluable tips for *TFX* and *Sam & Max*, an amazing look at the phenomenon of the *Microsoft Flight Simulator* series and a chance to vote in the PC Gamer 1994 Readers' Poll. Oh, and an exclusive ten-level coverdisk demo of *Sid & Al's Incredible Toons*.

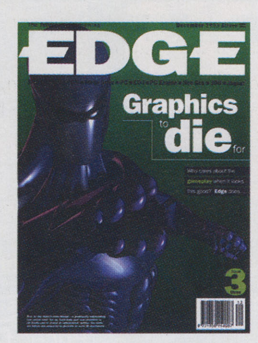
Gary Whitta, Editor

Back issues

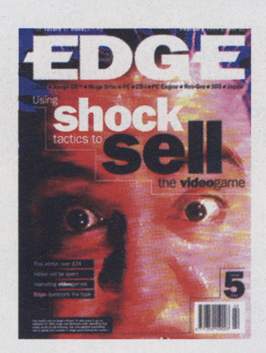
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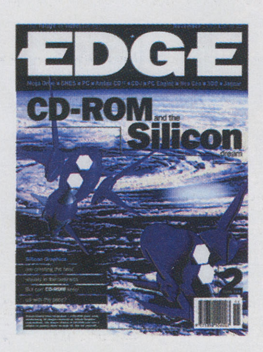
Edge one – 3DO: the real deal, Amiga CD32 launch, plus games in Dolby Surround sound



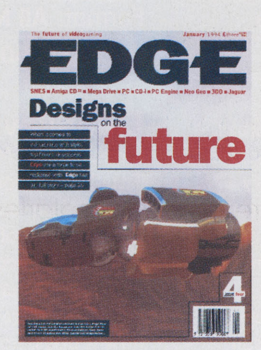
Edge three – First 3DO review, Virtual Reality explained, plus the Supergun home coin-op



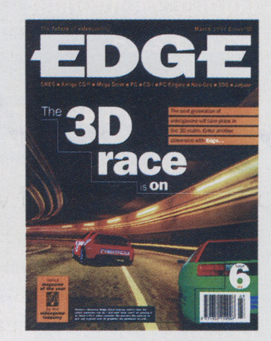
Edge five – First tech specs on Sega Saturn and Sony PS-X, plus Atari's Jaguar unleashed



Edge two – Atari's Jaguar console, the truth about CD-ROM, interactive TVs, plus sex and violence



Edge four – First Jaguar review, Bullfrog and Cryo exposed, plus NEC's classic PC Engine



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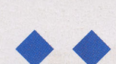
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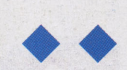
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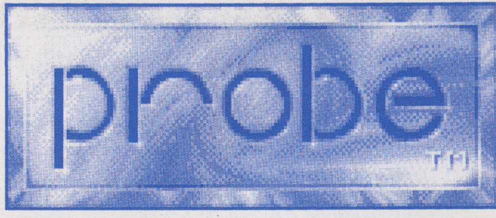
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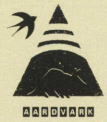
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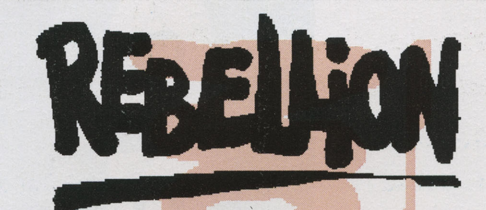
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SOUTH		
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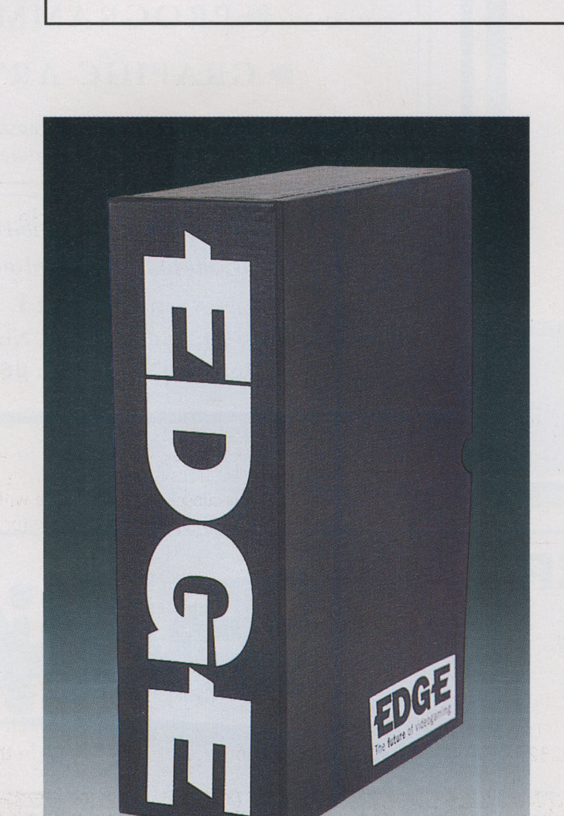
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Photographs: Jude Edginton

Jez San in the corridors of power. In just 14 years Argonaut Software has grown from a two-man operation into one of the biggest code shops in the UK, employing some 50-odd people. With interests across many technological disciplines, Argonaut are all set to ride the next wave – *whatever* it might be

An audience with: Jez San

Edge talks to Jez San, author of *Starglider* and the driving force behind Argonaut Software…

As a gamesplayer you can't fail to have noticed Jez San and his company Argonaut Software. And if you wouldn't recognise them in person you'll at least know their work. A little Super Nintendo game called *StarFox*, perhaps, and the Super FX chip which makes it happen?

Jez was 12 when he started coding on the BBC B and Tandy TRS80. He set up Argonaut with Richard Clucas in 1982 when he was just 17, and as such was one of the first lone coders to go into business and set up a company of his own. His tastes reveal a hacker of the old school: Chinese food, computers and a home full of gadgets. Jez is yet another video and TV nut, with all the requisite detritus like Nicam, S-VHS, LaserDisc and satellite TV. 'I watch Star Trek and The Simpsons on Sky One, but I don't watch anything else on satellite.'

Jez doesn't really give much away about himself, preferring to divert attention away from his personal details and toward his company and its achievements. In this country of recession-hit companies and Japanese and American takeovers, Argonaut is a British company that's doing rather well over here *and* over there.

Words by **Edge**
Answers by **Jez San**

EDGE Do you think there's too much 'spec-busting' going around, with companies trying to outdo each other?

Jez San Yes. I think that the figures are irrelevant anyway, it's how good the games are, and that's the most important thing.

Look at 3DO vs Jaguar. Both of them are trying to outdo each other on pixels per second, with 3DO claiming 50 million pixels per second and Jaguar claiming 850 million pixels per second. Both numbers are actually wrong and Atari is just playing the numbers game – they're talking about a 1bit pixel, a black and white screen. Nobody wants a black and white screen, so divide it by 16 or more – 24 bits even.

We don't really believe in the numbers game, because then people will be buying your product not on how good it is but on how big the number is that you put on the box.

Edge How did you get involved with Nintendo and the SFX chip?

Jez We had actually done a prototype of the *Starglider* game, which we called *NESGlider*. We showed it to Nintendo and they said this is really cool, we like the technology, and we'd like to see you do something on our new machine. So they gave us an early SNES machine, and within a week we'd ported *NESGlider* onto it.

However they decided it was a bit too 'cult', and they thought it wouldn't appeal to the mass market. To get a 3D game to appeal to people you have to spend time introducing them to the 3D concept and easing them in gently, which is of course the whole idea behind *StarFox*. We limited your movement to more or less straight ahead. It's more like a platform game, but in three dimensions.

By working with Nintendo closely, they taught us what it takes to make a very broad appeal game. So we did all the technical stuff and all the technology and we designed the chip, but we learned a lot from Nintendo about how to write mass market games. How to sell millions rather than hundreds of thousands.

Edge Do you think that your 3D games are more successful than your 2D games?

Jez The answer is yes, I guess so. But we're trying to make an effort in the last few years to not exclusively follow 3D games. We used to just disappear up our own arse for technology, now we actually firmly believe that gameplay is more important. Although we do have good technology, the emphasis has to be on gameplay and that's the way that we sell many more games.

Edge You mentioned CD-ROM there; do you think CD-ROM is any good? Or do you think it's going to improve later on?

Jez I think CD-ROM will catch on, but it is an intermediate technology. It's not the next big thing. There's going to be a gradual shift in videogame platforms, away from cartridge and into CD-ROM in the coming year or two, and from then it will last up to five years.

The really big thing is network games, video and games on demand. That needs a new infrastructure to be built, which is going ahead full speed in America but is lacking in England. Everyone in America is running around trying to be the first one on the block with games on demand, video on demand – fully interactive 'set-top boxes' as they're called.

You imagine that at the height of their sales Nintendo or Sega might sell 15 million machines, if they price them down under $100, yes? The cable people give their set-top boxes away free so people can receive cable TV. So there are 200 million cable TV watchers in America, and if each one of them was given a box, whoever gets onto the set-top is going to be the winner. We want to be part of that business so we're working on software and hardware for the set-top market.

Edge You say CD-ROM is a transitional format, but they said that about VHS and it seems to still be with us.

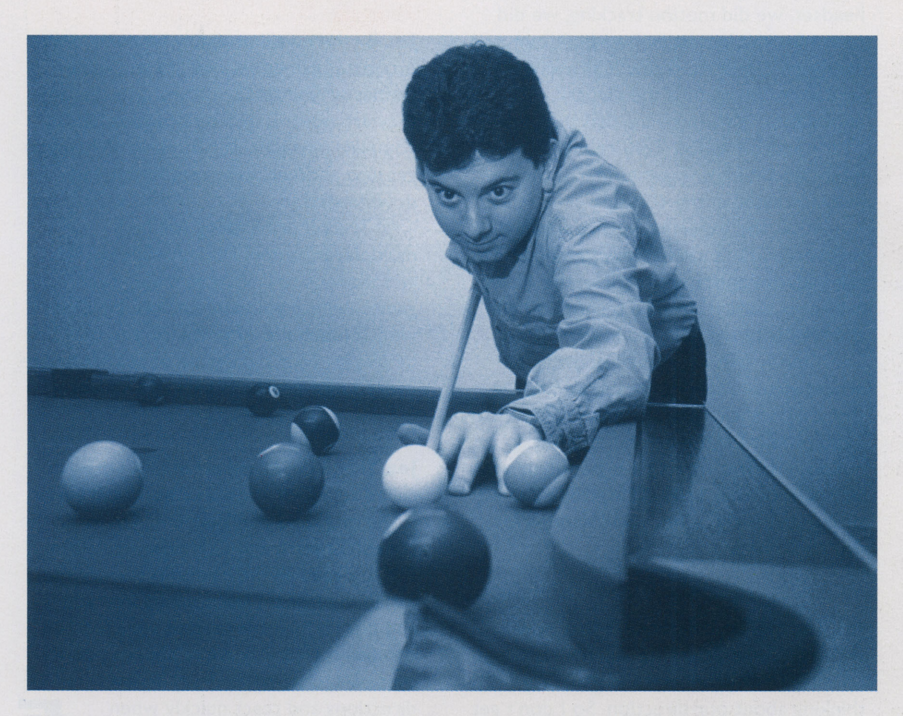
Jez The single-speed CD drives which some people still use are too slow. Most people are using double-speed drives and some people are using quad-speed drives. That does help the data rate issue, but then you can't fit much playing time on a disk. If you quadruple the data rate you only end up with 15 minutes of a movie, so you're talking about 12 disks, and nobody's going to swap that often.

What you really need is something like eight times density and four times speed on a CD. The technology isn't there yet, but even with the limitations you can still do fairly quick games.

Edge Of course, in the old days you had to be really quite clever to squeeze a good game into the low-technology machines, so perhaps limits are a good thing?

Jez In the old days when computers were constrained, you had to be a really brilliant programmer to squish things into that memory space, and write really fast code that would overcome the limitations of a really slow processor. The difference now is that in the old days the programmer could do the artwork as well, because you just couldn't display great art on a Spectrum, so anything the programmer could draw would be good enough. But these days, with 256 colours or 24bit colour, nobody is going to accept programmer-drawn artwork.

You need a real artist to do the artwork and a real musician to do the music, and the teams add up. Gone are the days when one person could do the entire project. Now a team of five is minimum,



Jez partakes of some in-house entertainment. 'Now we actually firmly believe that gameplay is more important. Although we do have good technology, the emphasis has to be on gameplay'

Continued next page

and we sometimes have teams of ten.

Edge Surely CD-ROM is an invitation for sloppy programming, with all the room you have for digitised source material?

Jez Playability is the most important thing for us. Content is important too, and as people's expectations get higher, we'll have better and better content, so we'll need better visuals. We'll have to film live action – hiring real actors, rather than just taking pictures of us in a dark room!

It's changing and it's getting closer to the movie industry. As the budgets for games increase, as people start to spend over a million dollars on content production for games, you're going to have to have higher production values. You'll have to have directors and art directors, scenery designers and stuff like that. It's going to happen.

Edge Perhaps this new direction in computer games will help revitalise the British film industry…

Jez Exactly. That's something we have seriously considered. There are a lot of skilled film industry people very close to here. Elstree Studios is only a few miles away, and they're really having trouble getting work. We could use facilities houses that we could rent out for a much cheaper rate than the film industry would be used to to. We're still doing a lot of computer graphics and computer rendering, but we'll be using actors and stuntmen where it counts.

Where you need real people we'll have them, but monsters, scenery and rooms… we don't actually have to build the set, we can model it and render it. Or we can even capture people's motion, and then apply our own alien bodies to them. So we get the real motion of an actor or stuntman, but the visual of what we're looking for in the game.



'I just soak up everything and distil it into a form that we need as a company. So we're able to pounce on new technologies… and react quickly when opportunities arise.'



'Now we're of a size where my full time is taken up selling our products…'

Edge You're known for 3D but what of VR? Have you made any steps toward that?

Jez We did a lot of work on virtual reality a few years ago – we built our own headset, we did motion tracking, we did optics for the lenses, and we built our own renderer… and we threw it all away. Virtual reality is still a theme park experience. It's something that people want to try once or twice. They're not interested in playing games in VR, they're just interested in the concept.

Also, the experiences that are being presented aren't satisfactory: the headsets are bad, the optics are terrible, the games are really unplayable. The technology and the creativity are going to have to grow enormously before people are going to accept virtual reality games as something that they want to play. It cannot offer what people want for the price. For a few hundred dollars we had a system that was far superior to a $100,000 system, and we threw that away as not good enough for the consumers.

Edge What's the difference between you five years ago and you now?

Jez The biggest difference is that now we're of a size where my full time is taken up selling our products, and generally thinking about our direction. So I don't get to program any more, which I really miss.

I do a lot of stuff that I enjoy, though. I do enjoy the travelling and the meeting people. I get to the West Coast of America at least once a month, sometimes twice a month, and I go to Japan two or three times a year. I don't actually take many holidays, because I do so much business travel and I enjoy it.

Edge So how do you see yourself in five years' time?

Jez By then we'll probably be doing direct broadcast games via satellite and cable. Games will be totally different to the way they are now. They'll be downloaded, as you play, into your set-top box. When you get into another area, another bit gets downloaded.

The other big thing will be multiplayer games. The network business will allow us to have true multiplayer games, where you could be playing chess with someone in America, or you could all be playing your own game of *StarFox* where every single person is part of a squadron.

Edge Do you find you spend a lot of your time keeping up with current trends?

Jez Yeah I do. I read *everything*. I'm what's called an information sponge. I read every single magazine that's around, I'm on all the bulletin boards, and Compuserve, CIX and BIX… I read all the newswires every day for all the news. I just soak up everything and distil it into a form that we need as a company. That way we're able to pounce on new technologies, head in new directions and react quickly when opportunities arise.

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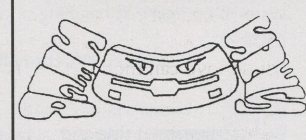
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questiontime



Technology advances, games systems get more complex and players demand answers. Send your questions into **Edge** for swift relief...

Q **1.** What are the chances of the following titles being available for the Jaguar? *X-Wing/Tie Fighter*, *TFX*, *Inferno* and *Beneath A Steel Sky*?
2. Are there any plans for a mouse or analogue joystick for the Jaguar?
3. Sega's Saturn and Sony's PlayStation-X are apparently more powerful than the Jaguar, yet they are only 32bit. What fundamental advantages does 64bit bring and how do the systems compare at handling polygons?

Stuart Wetherell

A **1.** LucasArts have one unnamed title and *X-Wing* would be an ideal choice. Similarly, both *TFX* and *Inferno* are fast, Gouraud-shaded polygon games that could be just as impressive on the Jaguar as they are on a DX2 PC. *Beneath A Steel Sky* is less likely to appear, although Virgin have yet to announce their full line-up of titles.
2. There are all kinds of peripherals planned for the Jaguar, a keyboard being one of them. Whether Atari have the initiative to release a mouse for gameplaying purposes remains to be seen, though.
3. 64bit doesn't necessarily mean a system is more powerful than 32bit. After all, the 8bit PC Engine is in some ways far more powerful than the 16bit Amiga 500. A 64bit processor on its own, though, will be able to process more data than a 32bit system – 64bits at a time – as opposed to 32bits at a time.

As for calculating polygons, this is where things can get very misleading. Take Atari's *Cybermorph* on the 64bit Jaguar. This manages around 6,000 polygons a second with a frame rate of about 10 fps (600 per frame). By comparison, Sega's *Virtua Racing* coin-op uses 32bit technology but with the help of five custom DSPs and other graphics chips it manages to chuck around 180,000 polygons a second at a virtually constant rate of 30 frames per second (6,000 per frame). And machines like Sega's Saturn, and particularly Sony's PS-X, are even more powerful than this!

It's a strange situation, but in a year's time Jaguar is going to look underpowered next to machines like these. Atari have made the jump to 64bit at an impressive price, but they haven't made quite the same gigantic leap in system performance that the Japanese have.

Q **1.** Do Commodore plan to release a device which turns your A500 into an A1200 or CD^{32}?
2. Is the maximum number of onscreen colours of the CD^{32} really only 256?
3. If so, couldn't PC games like *Rebel Assault* and *Day Of The Tentacle*, or SNES games like *SFII* be ported to the CD^{32} without loss of quality or gameplay?
4. What does the CD^{32}'s 'Chunky to Planar' chip do?

Ayman Agabani

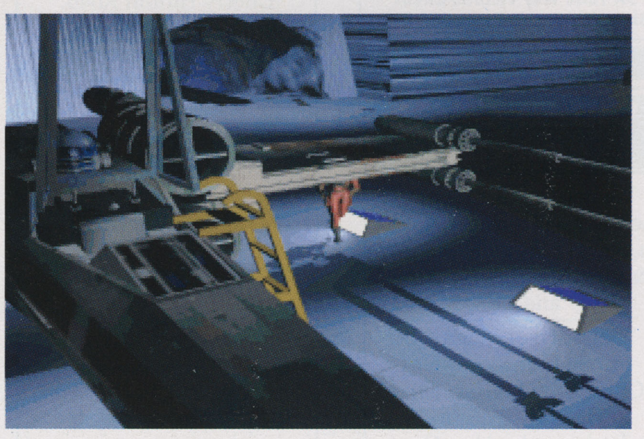
A **1.** No, the A1200 and CD^{32} use sufficiently different chipsets (AGA).
2. Yes.
3. Yes, there's no real reason why games like the ones you mention couldn't be converted perfectly. The CD^{32}'s lack of RAM compared to the average 386 or 486 PC (4 or 8 megabytes of onboard RAM is becoming the norm) might slow things down a bit and mean more data accessing. As for replicating SNES-style games, the CD^{32} hasn't really proved itself in the graphics department yet. It lacks the large number of hardware sprites and playfields that the SNES relies on, for one thing. This means that games like *SFII Turbo* on the CD^{32} would have a job keeping up in terms of the speed and smoothness of the action. We'd like to be proved wrong, though.
4. The CD^{32}'s nifty 'Akiko' chip converts PC graphics to Amiga graphics on the fly, therefore making CD^{32} conversions of PC games far easier for programmers to produce.

Q With videogaming entering the era of 24bit graphics (eg Jaguar, 3DO, Saturn etc), what type of TV/monitor would **Edge** recommend for fast, high resolution (flicker free) graphics? I own a Sony KV-M1420 with a Scart (inc RGB) input capable of a 60Hz display. Also, which inputs provide the best image: RGB, Composite, or S-Video?

Richie Da Silva, London

A There are certain things you should look for, but it all depends on how much you want to spend and what systems you intend to run on it. For example, if, like many people, you're planning to buy an imported Saturn or Sony PS-X later on in the year (come on, who isn't?), you'll need a TV/monitor that can handle an NTSC or RGB signal. UK PAL versions of machines like these will probably arrive with the next Ice Age, if we're lucky. And then there's always our 50Hz PAL TV standard to muck everything up even further.

So that you'll have the choice, at least, it's worth getting a TV or monitor with a Scart socket. Importers get round the NTSC problem by pulling an RGB signal



Rebel Assault **on the PC in 256 colours. But could the CD^{32} handle the game as well as the PC? (See letter from Richie Da Silva)**

from an NTSC console and outputting this through a 21 pin Scart (Euroconnector) plug. Usually this is the only way to get a 60Hz RGB signal working on a PAL TV or monitor. Watch out, though: some TV manufacturers like Toshiba are still including Scart sockets that are either restricted by a composite feed, ie can't handle an RGB signal, or are only configured to run at 50Hz. And to make things worse, many TV shop assistants wouldn't know the difference.

Of course, there's no guarantee that importers will be able to wire a new NTSC machine to Scart – 3DO proved impossible, remember. That's why you might want to consider an NTSC-compatible TV or monitor. This is one way to ensure that you'll be able to run a new NTSC console before anyone else, and without the necessary (and often experimental) Scart modification. Portable NTSC-compatible TVs start at around £250-300 but most larger sets cost around £700-800.

One thing is worth bearing in mind, though, and this answers the second part of your question. If you have an NTSC-compatible TV or monitor, you might find that it can only decode a certain type of NTSC signal – often RF. While this is adequate, you'll find that the picture quality won't be as good as an RGB signal through the Scart socket (the usual importers' route). And you'll get an even better picture through an S-Video socket, as long as the TV can handle NTSC through it.

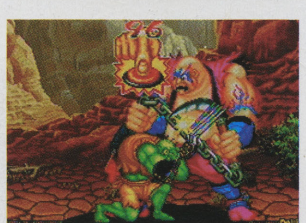
Q I am thinking of buying a Neo-Geo so I would like it if you could answer my questions on this system.

1. How many colours does the Neo-Geo display onscreen at once and how many colours are in the machine's palette?
2. Is it a full-screen machine, and not an awful letterbox-style screen like on the UK SNES and Mega Drive?
3. Is it the most advanced 16bit console available, or is it 32bit?
4. Could you tell me the other specifications such as sound chips, graphics chips, etc?
5. How many games are available for it?
6. And lastly, do you think it's worth the money?

Ian James, Sussex

A **1.** Onscreen it can handle 4,096 simultaneous colours from a palette of 65,525.
2. The Scart 60Hz version naturally has a full screen, but SNK did a fairly decent job on the PAL version and the difference in screen size and speed isn't that noticeable.
3. Even after three years, there's no doubt that for sprite-based, scrolling games, this is still the most powerful 16bit system around.
4. There are two processors in the Neo-Geo – a 16bit 68000 running at 12MHz and an 8bit Z80 running at 4MHz – but that doesn't mean it's a 24bit system. The system memory comprises 66K of main RAM and 82K of Video RAM, with a screen resolution of 320x224 pixels. But its strongest features are the three simultaneous playfields, and 380 hardware sprites which can be sized between 1x2 pixels up to a whopping 16x512. The sound chip – a Yamaha 2610 – isn't much cop for sound emulation – the Sony chip in the SNES is more refined. However, it has 13 channels and when handling megabytes and megabytes of samples (as the machine does), it sounds amazing. Powerful kit, all right.
5. Around 40.





The gorgeous *Magician Lord* (top) is under one third of the meg size of *Fatal Fury Special*

6. Not really. The hardware cost has never really been that excessive, but increasingly the games just seem to offer worse value for money. Cast your mind back to mid 1990 when the system first appeared. The first two games, *Magician Lord* and *Nam '75*, were more geared at the home user who – before the Neo-Geo arcade system took off – SNK seemed to care about. Both these titles were 'only' 46 megabits in size, and yet in comparison to more recent titles like *Fatal Fury II* (150 megs) and *Samurai Shodown* (118 megs) , they seem to pack more graphics, music, speech, and gameplay. And with newer 100 meg plus games now costing almost twice what early games used to – around £175 – it's difficult to justify the cost, especially when all they ever release are beat 'em ups. And of course, there's still that anomaly with SNK's claims about their games being measured in megabytes, too.



Sanyo's 3DO for the Japanese market was up and running at WCES. But are Japanese developers involved? (See letter from Imran Ashraf)

Q **1.** It seems to me that by the time 3DO gets going its technology will have been superseded by Sega's and Sony's new machines. Will 3DO be upgrading their hardware to compete?
2. It seems all the developers who have signed up for 3DO and Jaguar are American. What about Japanese firms like Konami, Capcom, HudsonSoft and Namco? Do they have any plans for either machine?

Imran Ashraf, Halifax

A **1.** Yes, 'downwardly compatible' is the phrase that Trip Hawkins bandied about at CES, when referring to future 3DO hardware, but one can't help wondering how directly it will disadvantage those people who have already bought a 3DO. With rumours of the UK 3DO having more RAM than the US system, let's hope 3DO developers don't have to cater for too many kinds of 3DO. After all, the concept of a standard rather disintegrates as soon as extra features are included on later models. Anyone remember how many games were written for the upgraded Commodore 128?
2. 3DO is okay on this score. 110 Japanese companies have signed up for development including the 'heavies' like Capcom, Namco and Konami, and Panasonic's 3DO will be released in Japan in late March. Unfortunately, Atari aren't as well catered for. Attracting development in Japan isn't easy if the machine isn't on sale there. And Atari's anti-Japanese marketing for the Jaguar in the States doesn't help them. This, coupled with poor Japanese sales of the Lynx – the xenophobic Japanese were less inclined to buy the Lynx than Westerners were – means that the Jaguar will probably have to survive without Japanese developers. A shame, really, particularly when top Japanese game designers have been a driving force behind the success of the console market. E

Q and A

As the world of videogames gets ever more complicated, it's reassuring to know you can count on Edge. Send your queries to: Q&A, Edge, 30 Monmouth Street, Bath, Avon BA1 2BW. You can fax us on 0225 338236, or e-mail us via future@cix.compulink.co.uk. with a subject line 'ATTN: Steve Jarratt'. Sorry, Edge cannot answer *any* questions over the phone and personal replies are not possible.

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